DEVOTED TO RESEARCH AND CLINICAL STUDY OF THE DISEASES AND PROCESSES OF THE AGED AND AGING

Geriatrics

VOLUME 7 July-August 1952 NUMBER 4

selected for emergencies*

A recent nationwide survey[1] of the drugs carried in the doctor's bag reveals the vital significance of Coramine. As pointed out by Krantz:

"Coramine has proved its value over the years and certainly may be considered the drug of selection for acute central nervous system depression.

It has largely replaced the less dependable caffeine sodium benzoate.... It should be mentioned that Coramine is gradually replacing picrotoxin in barbiturate intoxication, which lends further usefulness to this agent."[2]

* *Respiratory and circulatory emergencies, barbiturate poisoning, acute alcoholism, asphyxia neonatorum*

Coramine®

dependable respiratory and circulatory stimulant

Ciba

Summit, N. J.

For Progressive Benefits . . . Coramine Oral Solution For old and failing hearts, as in cardiac dyspnea, anginal symptoms, and coronary disease.

2/1923M

1. Matlin, E.: Current Med. Dig. 19:23, 1952. 2. Krantz, J.C., Jr.: Current Med. Dig. 19:27, 1952.

CORAMINE (brand of nikethamide) issued as a 25 per cent aqueous solution in ampuls 1.5 and 5 cc., multiple-dose vials 20 cc., and oral solution 30, 90, and 473 cc.

To prevent attack in angina pectoris

Prophylactic management of angina pectoris with Peritrate often helps not only to prevent or reduce the number of attacks[1] in certain cases but to increase exercise tolerance.[1,2]

In a recent study,[1] Peritrate was reported to prevent attacks in 3 out of 4 cases; 78.4% of patients experienced fewer attacks. In patients studied to determine Peritrate's effect on precordial pain produced by exercise, improvement, noted in every case, often reached 50-75%.

This new longer-lasting coronary vasodilator affords protection for 4 to 5 hours. With faithful adherence to a regular dosage schedule (1 to 2 tablets 3 to 4 times daily) patients may be rewarded by complete protection against attacks, reduction in the number of attacks, or reduction in the severity of attacks.

Peritrate, pentaerythritol tetranitrate, is free from serious toxic side effects; tolerance does not develop; and dosage and administration are simple.

Available in 10 mg. tablets in bottles of 100 and 500. Literature and samples on request.

1. *Angiology 3:1 (Feb.) 1952.*
2. *Angiology 3:16 (Feb.) 1952.*

Peritrate® ACCEPTED COUNCIL ON PHARMACY AND CHEMISTRY AMERICAN MEDICAL ASSOCIATION

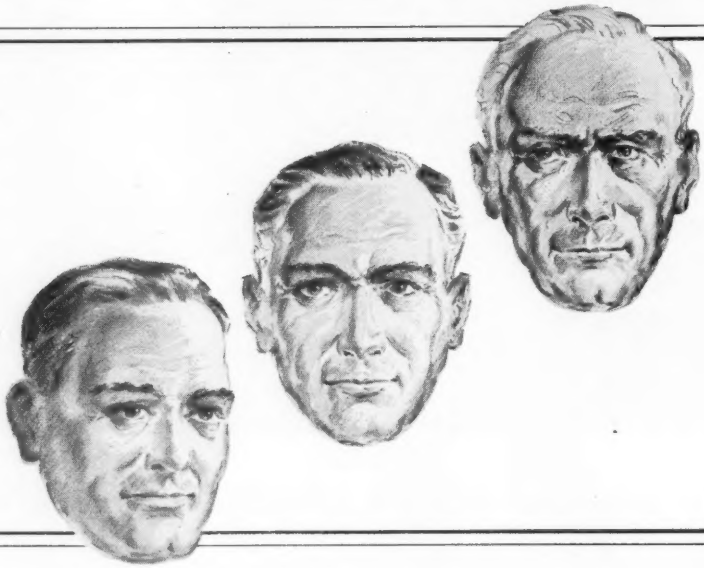
TETRANITRATE

(brand of pentaerythritol tetranitrate)

CHILCOTT *Laboratories, INC.* MORRIS PLAINS, NEW JERSEY

FORMERLY THE MALTINE COMPANY

...the best is yet to be



For those approaching middle life, the years ahead *can* be the best – provided normal metabolic functions are safeguarded. In such interrelated disorders as atherosclerosis, diabetes mellitus, and liver disease, the clinical findings are likely to include abnormal fat metabolism (with accompanying deposition of cholesterol) and abnormal capillary fragility.

Prophylaxis against these threats to the older patient may be established and maintained with VASCUTUM.

VASCUTUM

Trademark

for the life that begins at forty

VASCUTUM* presents an unusually complete lipotropic combination *plus* the specific capillary protectants, rutin and ascorbic acid.

The average daily dose (6 tablets) provides:			
Choline	1 Gm.	Pyridoxine HCl	4 mg.
Inositol	1 Gm.	Rutin	150 mg.
dl-Methionine	500 mg.	Ascorbic Acid	75 mg.
SUPPLIED: Bottles containing 100 tablets			

schenley

SCHENLEY LABORATORIES, INC.
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dermatoses

eczemas

external ulcers

diaper rash

new, effective, faster, safer treatment

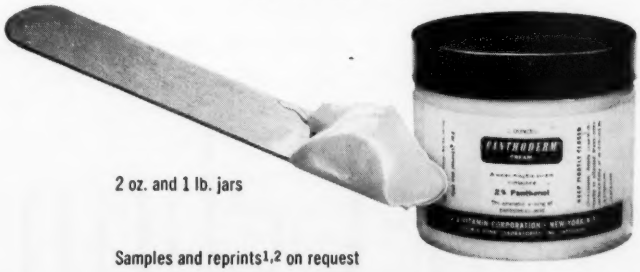
panthoderm
cream

first and **only** topical therapy to contain panthenol

CLINICALLY EFFECTIVE — new studies[1,2] show that topical panthenol (analog of pantothenic acid) "favorably influenced the course of various ulcerative and pyogenic dermatoses. A majority healed and many showed various degrees of improvement." Even long standing conditions resistant to other therapy seem to respond to Panthoderm Cream which . . .

- **relieves pain and itching**
- **promotes granulation and healing**

PLEASANT TO APPLY — non-staining, smooth-spreading; nontoxic, relatively non-sensitizing.



2 oz. and 1 lb. jars

Samples and reprints[1,2] on request

U. S. VITAMIN CORPORATION
Casimir Funk Laboratories, Inc. (affiliate)
250 East 43rd St., New York 17, N. Y.

Provides All Essential Vitamins

and those trace elements believed to be indispensable

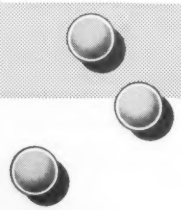
One Tablet 'Mi-Cebrin' daily provides:

Thiamine Mononitrate	10 mg.
Riboflavin	5 mg.
Pyridoxine Hydrochloride	2 mg.
Pantothenic Acid (as Calcium Pantothenate)	10 mg.
Nicotinamide	30 mg.
Vitamin B_{12} (Activity Equivalent)	3 mcg.
Folic Acid	0.1 mg.
Ascorbic Acid (as Sodium Ascorbate)	100 mg.
Alphatocopherol	5 mg.
Vitamin A	10,000 U.S.P. or I. units
Vitamin D	1,000 U.S.P. or I. units

and also furnishes (approximate amounts):

Iron (as Ferrous Sulfate)	15 mg.
Copper (as the Sulfate)	1 mg.
Iodine (as Potassium Iodide)	0.15 mg.
Cobalt (as the Sulfate)	0.1 mg.
Boron (as Boric Acid)	0.1 mg.
Manganese (as the Glycerophosphate)	1 mg.
Magnesium (as the Oxide)	5 mg.
Molybdenum (as Ammonium Molybdate)	0.2 mg.
Potassium (as the Chloride)	5 mg.
Zinc (as the Chloride)	1.5 mg.

Eli Lilly and Company • INDIANAPOLIS 6, INDIANA, U. S. A.



An ideal dietary supplement

Mi-Cebrin

(VITAMIN-MINERAL SUPPLEMENTS, LILLY)

GERIATRICS

Official Journal of the American Geriatrics Society

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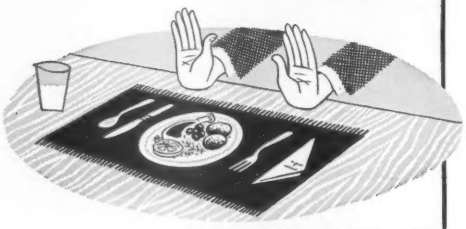
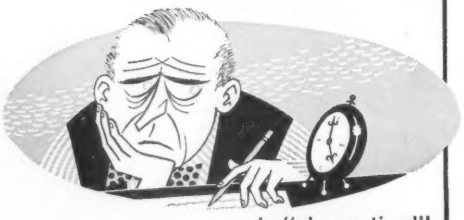
When the patient

. . . sleeps poorly



. . . doesn't eat well



. . . is "always tired"

Restoration of a normal emotional picture is often facilitated by including BĒPLETE in the therapeutic regimen.

BĒPLETE®

Vitamin B-Complex with Phenobarbital Wyeth

A judicious combination of low dosage sedation and high dosage vitamin B therapy, including vitamin B_{12}.

Available as a highly palatable Elixir, and as Tablets. Also available, BĒPLETE with BELLADONNA for combined antispasmodic-sedative action; Elixir and Tablet forms.

Wyeth®

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No Other Hypotensive Combines these...

VERILOID®

IN HYPERTENSION

Veriloid, a product of Riker Laboratories research, is an alkaloidal extract of hypotensive principles obtained by fractionation from Veratrum viride. It is freed from the dross of the mother substance. Biologically assayed in mammals, with drop in blood pressure as end point. Generically designated alkavervir.

1. Uniformly potent; constancy of pharmacologic action permits exactitude in dosage calculated in milligrams . . .
2. A unique process of manufacture produces a tablet which dissolves slowly, thus assures Veriloid absorption and action over a considerable period . . .
3. Moderates blood pressure by vasorelaxant action independent of vagomotor effect . . .
4. No ganglionic or adrenergic blocking . . .
5. Lability of blood pressure, so important in meeting the demands of an active life, is not interfered with; no danger of postural hypotension . . .
6. Cardiac output is not reduced . . .
7. No compromise of renal function . . .
8. Cerebral blood flow is not decreased . . .
9. Tolerance or idiosyncrasy rarely develops . . .
10. Hence can be given over long periods in the aim to arrest or lessen progression of hypertension . . .
11. Well tolerated in properly adjusted dosage; does not lead to headache . . .
12. Produces a prompt and sustained drop in blood pressure in all forms of hypertension.

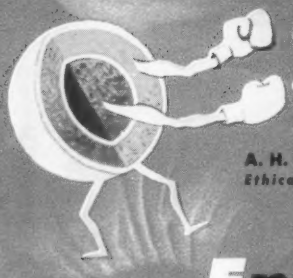
Veriloid is available in 3 dosage forms: Veriloid (plain) in 1, 2, and 3 mg. tablets; Veriloid-VP (Veriloid, 2 mg., and phenobarbital, 15 mg.); Veriloid-VPM (Veriloid, 2 mg., phenobarbital, 15 mg., and mannitol hexanitrate, 10 mg.).

RIKER LABORATORIES, INC., 8480 BEVERLY BLVD., LOS ANGELES 48, CALIF.

THE *two-fisted* TABLET

for the dyspeptic patient

Entozyme 'Robins' is indicated for the many varied manifestations of functional dyspepsia, so often accompanied by enzymatic hypofunction:



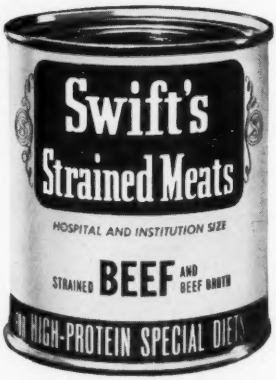
- releases *pepsin* in the stomach
- releases *pancreatin* and *bile salts* in the small intestine.

A. H. ROBINS CO., INC. · Richmond 20, Va.
Ethical Pharmaceuticals of Merit since 1878

Entozyme® Robins

FORMULA: Each double-layered tablet contains pepsin N.F. 250 mg., pancreatin U.S.P. 300 mg., and bile salts 150 mg.

Easy, palatable way to add protein to special diets



New economical 12-ounce size

7 VARIETIES

• BEEF • LAMB • PORK • VEAL • LIVER • HEART • LIVER AND BACON

Doctors recommend–

Swift's Strained Meats, just like the original Swift's Meats for Babies. They are an excellent source of biologically valuable proteins, B vitamins, and food iron—and they are low in fat content.

Patients appreciate–

Palatable Swift's Strained Meats, when they need a high-protein, soft diet—such as in geriatrics feeding, ulcer management, pre- and post-operative care.

Nurses welcome–

Swift's Strained Meats in hospitals, nursing or convalescent homes, and other institutions, because these meats are so convenient to serve. The individual particles are strained fine enough even for tube feeding!

Chefs cut costs–

With Swift's Strained Meats, because these meats are expertly prepared and ready to serve. And the new economical *12-ounce* size saves time, and cuts labor costs even further in the special diet kitchen.

All nutritional statements in this advertisement accepted by the Council on Foods and Nutrition of the American Medical Association.

SWIFT & COMPANY

Send for Free Booklet

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Dept. RL2, Chicago 9, Illinois

☐ Send me free booklet on uses and costs of Swift's Strained Meats in the new 12-ounce institutional size.

☐ Your representative may call on me.

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NEW

unmatched for injection-ease

sterile, *single-dose* cartridges
and *unique* universal syringe

ideal for emergency bag
ready for immediate use
no preparation necessary
no sterilization of syringe or needle

introduced by Pfizer *world's largest producer of antibiotics*

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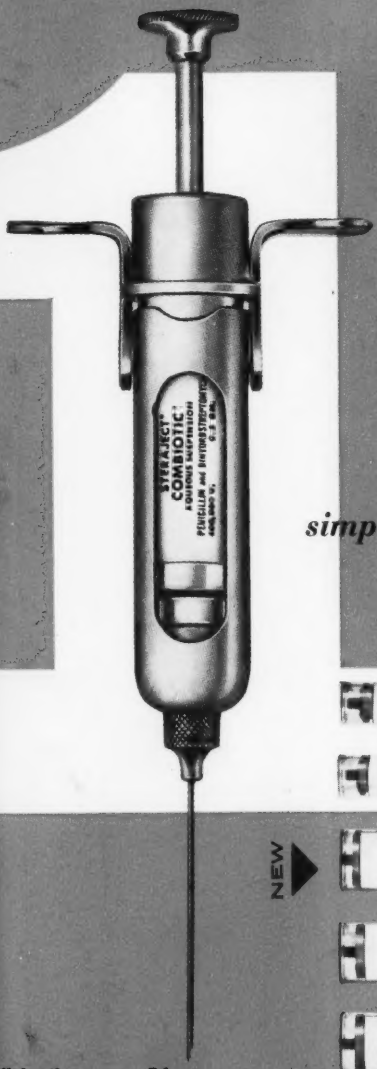

***one* universal syringe**
for *two* cartridge sizes

***one* steraject cartridge**
for a *full pre*measured dose

***one* sterile needle**
supplied with every cartridge

***one* operation**
for parenteral antibiotic therapy

Plunger and cartridge connect...
you can *aspirate* before injecting!

simplest parenteral therapy available

Steraject Penicillin G Procaine Crystalline in Aqueous Suspension (300,000 units)

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NEW

Steraject Penicillin G Procaine Crystalline in Aqueous Suspension (1,000,000 units)

Steraject Combiotic® Aqueous Suspension (400,000 units Penicillin G Procaine Crystalline, 0.5 Gm. Dihydrostreptomycin)

Steraject Dihydrostreptomycin Sulfate Solution (1 gram)

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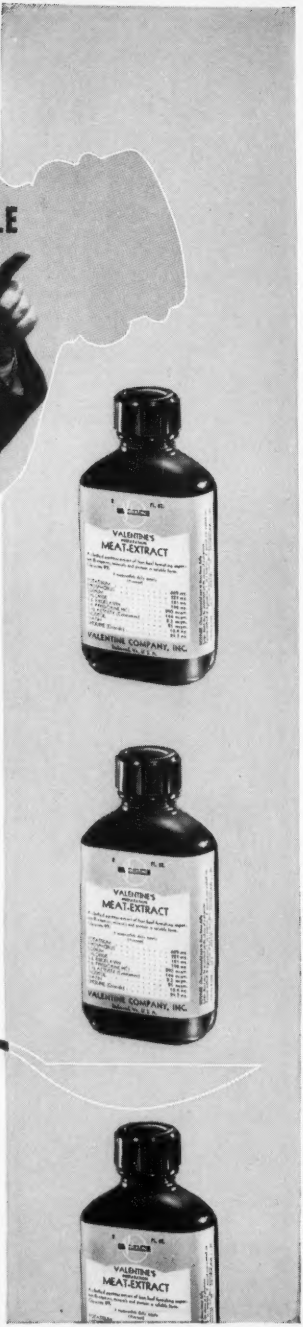
for full details, see your Pfizer Professional Service Representative

Steraject Cartridges: *each one supplied with new sterile needle, foil-wrapped*

ANTIBIOTIC DIVISION • CHAS. PFIZER & CO., INC. • BROOKLYN 6, N. Y.

OLD AGE BENEFITS

IN EVERY BOTTLE



VALENTINE'S MEAT EXTRACT

HAS SPECIAL VALUE FOR THE AGED AND AGING, PROVIDING:

the psychologic benefits of a "tonic", plus
the physiologic benefits derived from

- stimulation of failing appetites
- increased flow of digestive fluids
- supplementary amounts of vitamins, minerals and soluble proteins
- extra-dietary vitamin B_{12}
- protective quantities of potassium in a palatable and readily assimilated form

Supplied in bottles of 2 fluidounces.

DOSAGE: One teaspoonful two or three times daily. Two or three times this amount may be prescribed for potassium therapy.

VALENTINE COMPANY, INC.

RICHMOND 9, VIRGINIA

"particularly useful...
for the routine therapy
of the
menopause"[1]

ESTINYL

ESTINYL® Tablets alleviate menopausal symptoms rapidly and smoothly in very small doses. A derivative of estradiol, ESTINYL (ethinyl estradiol) produces the sense of well-being characteristic of therapy with natural estrogens.

Tablets of 0.02, 0.05, and 0.5 mg.

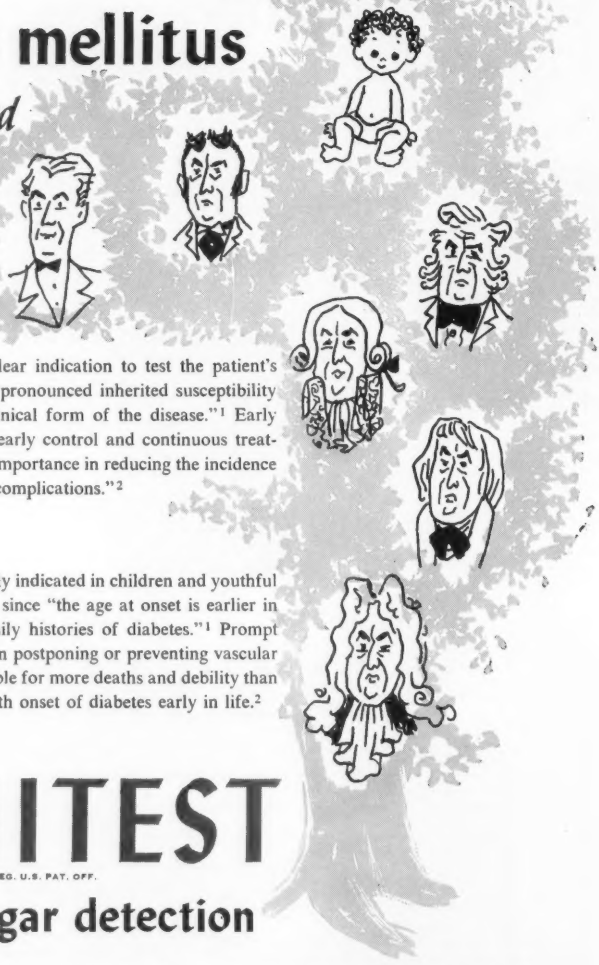
1. Perloff, W. M.: Am. J. Obst. & Gynec. *58*:684, 1949.

Schering CORPORATION
BLOOMFIELD, N. J.

ESTINYL
SCHERING

"diabetes mellitus

shows a marked familial tendency"[1]



the diabetic family

Every case of diabetes is a clear indication to test the patient's relatives for evidence of the "pronounced inherited susceptibility to the development of the clinical form of the disease."[1] Early diagnosis makes possible the early control and continuous treatment that are "of the greatest importance in reducing the incidence and severity of degenerative complications."[2]

diabetes in children

Testing for diabetes is especially indicated in children and youthful members of diabetic families, since "the age at onset is earlier in those cases with positive family histories of diabetes."[1] Prompt control is a significant factor in postponing or preventing vascular complications—now responsible for more deaths and debility than all other causes in patients with onset of diabetes early in life.[2]

CLINITEST

BRAND • REG. U.S. PAT. OFF.

for urine-sugar detection

Detection of urine-sugar is simple, reliable and rapid with *Clinitest* (Brand) Reagent Tablets. The results are directly read. No external heating is needed. *Clinitest* is excellent for office and clinic, and for diabetic patients.

1. Watson, E. M., and Thompson, M. W.: Am. J. Digest. Dis. *18*:326, 1951.
2. Wilson, J. L.: Root, H. F., and Marble, A.: J.A.M.A. *147*:1526 (Dec. 15) 1951.

AMES COMPANY, INC. | ELKHART, INDIANA
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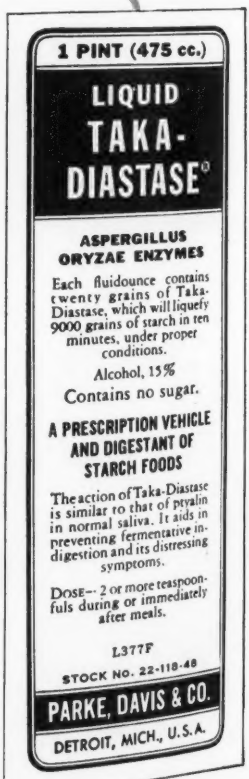
C-3

makes medication more pleasant

LIQUID TAKA-DIASTASE®

PALATABLE VEHICLE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LIQUID
TAKA-
DIASTASE®
ASPERGILLUS
ORYZAE ENZYMES
Each fluidounce contains twenty grains of Taka-Diastase, which will liquefy 9000 grains of starch in ten minutes, under proper conditions.
Alcohol, 15%
Contains no sugar.
A PRESCRIPTION VEHICLE AND DIGESTANT OF STARCH FOODS
The action of Taka-Diastase is similar to that of ptyalin in normal saliva. It aids in preventing fermentative indigestion and its distressing symptoms.
DOSE—2 or more teaspoonfuls during or immediately after meals.
L377F
STOCK NO. 22-118-48
PARKE, DAVIS & CO.
DETROIT, MICH., U.S.A.

LIQUID TAKA-DIASTASE provides a *pleasanter* way to give disagreeable medication. Its attractive light brown color and pleasing nut-like flavor make this product an ideal vehicle for masking the taste of unpalatable medicinal agents.

Your Parke-Davis Professional Service Representative will gladly tell you of the many useful drugs which can be "q.s.'ed" with LIQUID TAKA-DIASTASE to provide an enhanced therapeutic combination.

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Parke, Davis & Company
DETROIT, MICHIGAN

FLAVOR

Makes mealtime truly enjoyable for patients in the upper-age bracket.

HOW fortunate for patients on soft food diets that all Beech-Nut Strained Foods taste so good!

The finest raw fruits, vegetables and meats are scientifically processed to retain appetizing flavor and natural food values in high degree.

The variety for your recommendation is wide and interesting. Beech-Nut Strained Foods help your elderly patients get more pleasure from their meals.

A wide and appealing variety of Meat and Vegetable Soups, Vegetables, Fruits and Desserts for your recommendation.

Add zest to soft food diets

Beech-Nut

STRAINED FOODS

have been accepted by the Council on Foods and Nutrition of the American Medical Association, not only for feeding of the young, but also for special diets including the aged.

For Better Results

Stuart V-C-M

VITAMINS, CALCIUM, MINERALS

11 VITAMINS *including both types of* **B_{12}**
8 MINERALS *including larger amounts of* **CALCIUM**
in 1 small tablet

Suggested Daily Dose	*as a Dietary Supplement*	*In Geriatrics*	*Therapeutic Administration Inc. Pregnancy*
	1 Tablet	*2 Tablets*	*3 Tablets*
VITAMIN A	5,000 USP Units	10,000 USP Units	15,000 USP Units
VITAMIN D	400 USP Units	800 USP Units	1,200 USP Units
VITAMIN C	50 Mg.	100 Mg.	150 Mg.
VITAMIN E	0.85 Mg.	1.7 Mg.	2.55 Mg.
VITAMIN B_1	3 Mg.	6 Mg.	9 Mg.
VITAMIN B_2	3 Mg.	6 Mg.	9 Mg.
VITAMIN B_6	0.5 Mg.	1 Mg.	1.5 Mg.
NIACIN AMIDE	15 Mg.	30 Mg.	45 Mg.
PANTHENOL	4.3 Mg.	8.6 Mg.	12.9 Mg.
FOLIC ACID	0.5 Mg.	1 Mg.	1.5 Mg.
VITAMIN B_{12}*	1 Mcg.	2 Mcg.	3 Mcg.
CALCIUM	250 Mg.	500 Mg.	750 Mg.
PHOSPHORUS	190 Mg.	380 Mg.	570 Mg.
IRON	10 Mg.	20 Mg.	30 Mg.
COPPER	0.5 Mg.	1 Mg.	1.5 Mg.
IODINE	0.075 Mg.	0.15 Mg.	0.225 Mg.
COBALT	0.05 Mg.	0.1 Mg.	0.15 Mg.
ZINC	0.1 Mg.	0.2 Mg.	0.3 Mg.
MANGANESE	0.3 Mg.	0.6 Mg.	0.9 Mg.

*50% U.S.P. Crystalline *50% B_{12} Concentrate

Available at all pharmacies

LOW IN COST TO PATIENTS

Stuart

NEW

AN OUTSTANDING PRODUCT FOR OBESITY CONTROL

ALL 5 FACTORS IN 1 SMALL CAPSULE

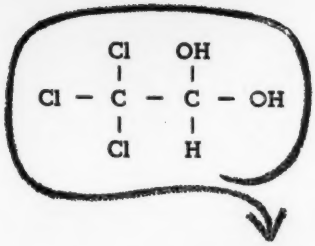
Stuart Amvicel

1. **To inhibit appetite, each capsule contains:**
   5 mg. dextro amphetamine sulphate
2. **To offset nervous stimulation:**
   ¼ gr. phenobarbital
3. **To supply needed bulk:**
   200 mg. methylcellulose
4. **To supply protective amounts of nutritional factors:**
   10 vitamins and 8 minerals
5. **Low in cost to patients:**
   Approximately 4¢ per capsule

AVAILABLE AT ALL PHARMACIES

Stuart

EACH STUART AMVICEL CAPSULE CONTAINS: Dextro-Amphetamine Sulphate 5 mg.; Phenobarbital, ¼ gr.; Methylcellulose, 200 mg.; A, 1700 USP units; D, 17 USP units; C, 25 mg.; B1, 1 mg.; B2, 1 mg.; Niacin Amide, 10 mg.; B6, 0.15 mg.; B12, 1 mcg.; Folic Acid, 0.15 mg.; Calcium Pantothenate, 1.5 mg.; Calcium, 40 mg.; Phosphorus, 30 mg.; Iron, 3 mg.; Copper, 0.25 mg.; Iodine, 0.05 mg.; Cobalt 0.167 mg.; Manganese, 0.33 mg.; Zinc, 0.1 mg.



CAPSULES CHLORAL HYDRATE – *Fellows*

ODORLESS • NON-BARBITURATE • TASTELESS

AVAILABLE:

CAPSULES CHLORAL HYDRATE – Fellows

3¾ gr. (0.25 Gm.) BLUE and WHITE CAPSULES
bottles of 24's
100's

7½ gr. (0.5 Gm.) BLUE CAPSULES
bottles of 50's

3¾ gr. (0.25 Gm.) *BLUE and WHITE* CAPSULES CHLORAL HYDRATE – *Fellows*

Small doses of Chloral Hydrate (3¾ gr. Capsules Fellows) completely fill the great need for a daytime sedative. The patient becomes tranquil and relaxed yet is able to maintain normal activity.

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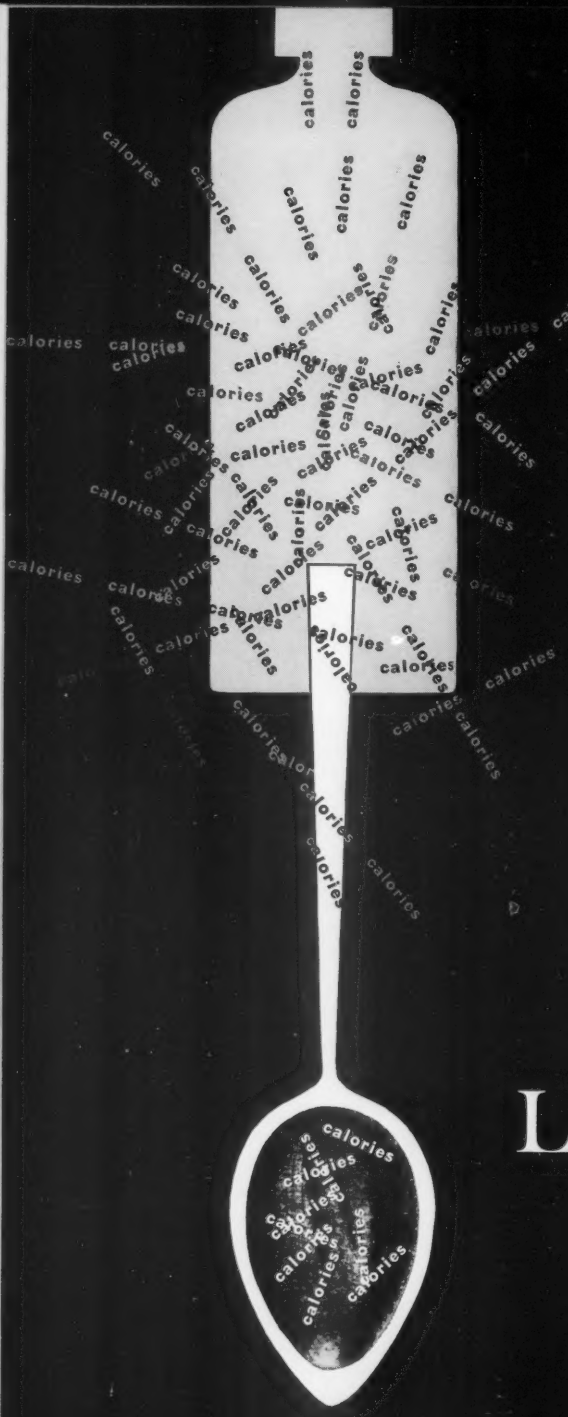

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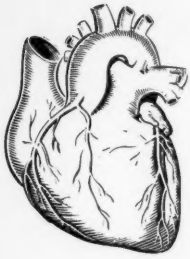

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10. Benson, R. A.: J. Ped. **31**:4, 1947
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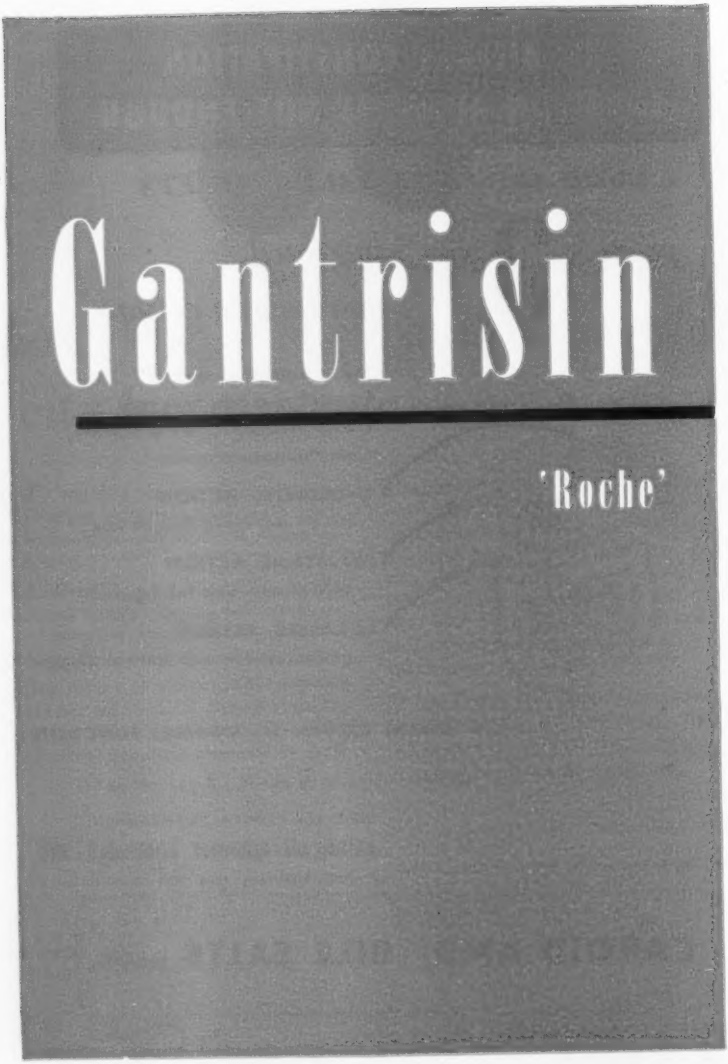
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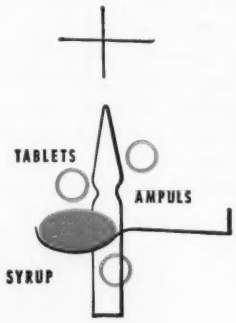

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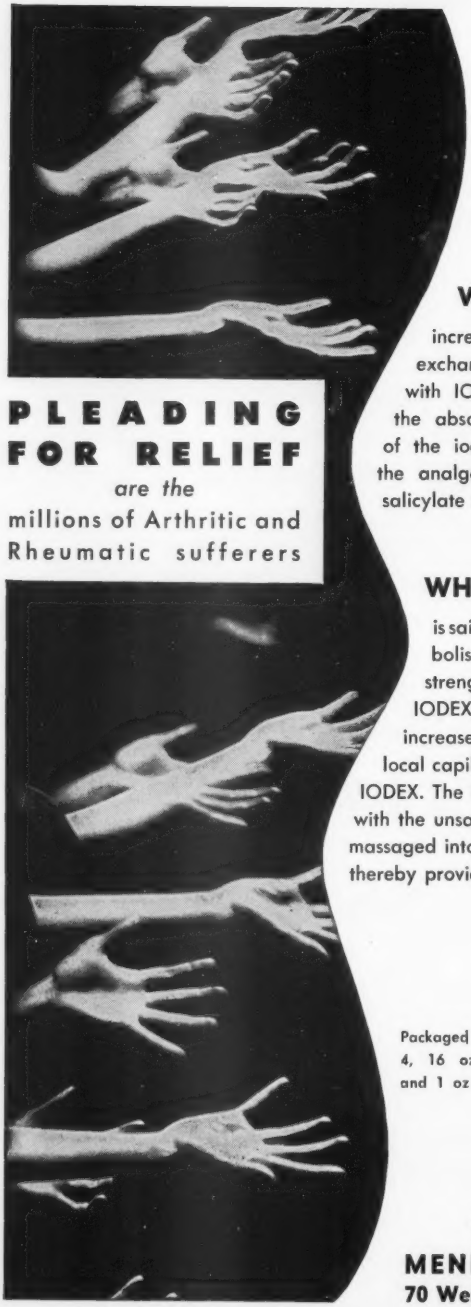

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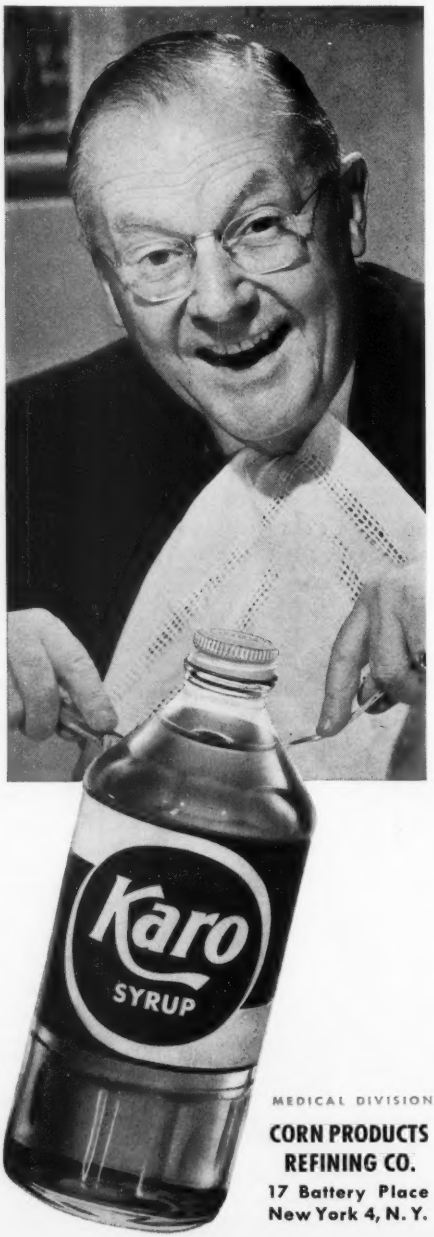

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Looking forward

papers and authors you will meet in coming issues . . .

The symptom complex of the menopause, precipitated by declining or arrested ovarian function, can be largely relieved by hormone replacement therapy, according to Dr. Robert B. Greenblatt, professor of endocrinology at the Medical College of Georgia. Writing on **Newer Concepts in Management of the Menopause,** he reports that treatment with estrogens or estrogen-androgen combinations administered in gradually diminishing doses over a period of five or six months was effective in 96.9 per cent of patients in alleviating bleeding, flushes, urinary frequency, stress incontinence, osteoporosis and other menopausal disturbances. By contrast, administration of placebos showed no improvement in 83.8 per cent of patients.

●

Clinical Problems in Geriatric Rehabilitation are discussed by Dr. Michael M. Dacso, director of physical medicine and rehabilitation at Goldwater Memorial Hospital, New York City. He describes treatment measures for hemiplegia, osteoarthritis, hip fractures, amputations, neuromuscular diseases and other handicapping conditions, and suggests a system of charting the patient's progress in performing essential everyday activities. The author emphasizes that restoration to the fullest physical, mental, social, economic and vocational usefulness calls for a geriatric clinic offering medical and surgical services, rehabilitation facilities, nutritional consultation, psychosocial service, and vocational and employment counselling.

●

A study of old people with progressive debility not associated with specific organic illness indicates that poor nutritional status due to loss of appetite is a primary factor. Dr. N. Vinther-Paulsen of Copenhagen, Denmark, reporting on **Senile Anorexia,** suggests that the high incidence of nutritive failure among the aged is related to various physical and psychological conditions peculiar to this age group. The importance of appetite stimulation and adequate diet is stressed.

●

Proliferation of endothelial cells of the blood vessel walls, considered to be the normal aging process, may be a predisposing factor in the development of arteriosclerosis, according to Dr. Robert Altschul, professor of histology at the University of Saskatchewan. In a discussion of **Cellular Patterns of the Vessel Wall—Its Alterations in Old Age and Disease,** he states that morphologic changes should be taken into consideration in studying vascular lesions.

●

For these and other articles, abstracts and reviews, read every issue of Geriatrics.

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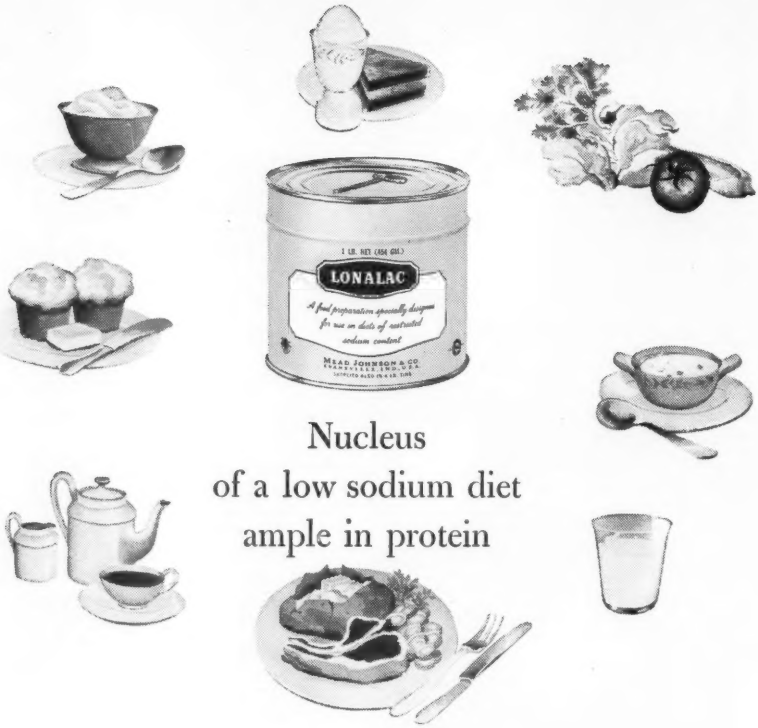
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GERIATRICS

Official Journal of the American Geriatrics Society

VOL. VII, NO. IV

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GERIATRICS

The Management of Stress Incontinence*

John W. Huffman, M.D., *and J. Kenneth Sokol,* M.D.

LACK of perfect vesical control is a complaint voiced by many women, particularly those in the older age group who have borne children. In the past it was customary to assume that these women, unless afflicted with a urogenital fistula or an evident neurologic lesion, were suffering from stress incontinence. Although often a solitary, clearcut complaint, stress incontinence is not a clinical entity. It has sometimes been loosely used as a diagnostic term for incontinence due to any one of several primary causes: intrinsic vesical or urethral pathology, injury to the intrinsic urethrovesical sphincters, or neurological lesions. It may be defined as the involuntary loss of urine from the bladder following a sudden increase in intra-abdominal pressure. Most often it is due to failure of the mechanism involved in the voluntary inhibition of urination.

Two years ago the Departments of Urology and of Obstetrics and Gynecology at Northwestern University Medical School joined together in a long term study of stress incontinence. We have, from time to time, enlisted the aid and advice of colleagues in other departments, notably neurology, physical medicine and radiology. It is believed that such a joint effort will be more fruitful in clarifying the problem than individual endeavors separately pursued. This presentation offers factual data relating to our results in the study and management of patients complaining of stress incontinence.

Of the 225 patients under observation, 89 per cent had anatomical lesions of the supporting tissues of the urethra and anterior vaginal wall. The remaining 11 per cent had intrinsic vesical or urethral pathology or were still incontinent after an anterior vaginal wall repair had corrected a preexist-

*From the Departments of Obstetrics and Gynecology and of Urology, Northwestern University Medical School, Chicago, Illinois. Presented at the Second International Gerontological Congress, St. Louis, Missouri, September 13, 1951.

ing anatomical lesion. There were, in addition, two patients with neurologic disease and one with achrondroplasia whose incontinence could not be explained.

Today there are diverse methods which may be employed in the treatment of stress incontinence. If properly utilized, they enable the gynecologist and urologist to select a fitting procedure for a particular case. There should be a decrease in unsatisfactory results obtained with the earlier more stereotyped procedures.

Some patients with low grade infections of the bladder, trigone and urethra will have stress incontinence as one of their complaints. Their symptoms, including the incontinence, will be alleviated by urethral instillations and dilatations. In this group it is necessary to differentiate between true stress incontinence and stress incontinence secondary to urethral or bladder pathology. This is particularly important because many of the women in the latter group will have some pelvic musculofascial relaxation in addition to their urinary tract pathology; surgical repair of the anatomic lesion will not correct the pathology which is causing their symptoms.

Infrequently, patients with stress incontinence who are given estrogens note some improvement in their incontinence. We have not seen enough cases of this type to offer an explanation for the improvement.

THE MOST widely used procedure for the relief of stress incontinence was, and still is, some modification of the surgical technic described by Kelly in 1913 for urethrocele repair. Plicating sutures are placed in the connective tissue of the urethrovaginal septum beneath the urethra and base of the bladder. Success of the operation depends to a large extent upon thorough visualization of the dense connective tissue layers, firm union of those layers and their approximation above the level of the bladder neck. If a coincident cystocele is present it should also be repaired. At the end of the procedure the urethra and bladder should be well supported by a broad shelf of firm tissue. The urethra should be snugly placed against the symphysis. The proximal urethra should be curved ventrally and superiorly behind the symphysis and the external meatus should be slightly within the inner margin of the vulvar vestibule.

The results of the Kelly technic have been only fair. In large groups of cases reported in the literature the cure rate ranges from 65 to 90 per cent. In reviewing our failures we have been impressed by several factors. Incontinence will probably recur if the repair does not return the urethra to its correct position, permitting it instead to lie in the plane of the vagina. Abnormal physical exertion during the period of tissue healing may cause a recurrence of the original lesion. In the patients who had recurrent stress incontinence after a vaginal plastic operation, 75 per cent had demonstrable recurrent anatomical relaxations of the periurethral supporting tissues. Some of these lesions had recurred several times, suggesting that the habitus of the patient may be a factor in these recurrences.

Vaginal operative procedures other than the Kelly plication operation have been devised for the relief of stress incontinence. Reis and DeCosta free the urethra from the periurethral supports and attach it to the symphysis. Kennedy believes that periurethral scar tissue distorts the urethral sphincter; he, therefore, frees the urethra from the area of scarring before doing a repair. Ox fascia and metal plates beneath the urethra, transplantation of the bulbocavernosus and gracilis muscles and transplants of fascia lata have been used in a number of ingenious ways in the operations designed to cure stress incontinence. Most of them have not been widely accepted. All of them attempt to return the urethra to its original anatomical location behind and above the symphysis and to give it a firm periurethral support.

ANOTHER APPROACH to the problem of stress incontinence utilizes the basic principle of exercise to develop muscles weakened in tone and in strength. In treatment, patients are given perineal exercises to strengthen the apparatus for the voluntary inhibition of urination. This apparatus may be demonstrated by asking the normal woman to contract her pelvic muscles as though she were inhibiting urination. Rectal and vaginal examination at that time shows the coccyx pulled ventrally and tension in a firm broad band of tissue extending from the coccyx, about the rectum and vagina, to the region of the middle and proximal urethra. The external urethral meatus is pulled upward and forward. The anterior vaginal wall and urethra form a concave arch behind the symphysis. Weakness of this mechanism for the voluntary inhibition of urination is responsible for most stress incontinence.

The exercises consist of voluntary contractions repeated many times daily (100 to 300 times) for many weeks. Contractions against resistance (an air filled balloon in the vagina) have been advocated by Kegel. Patients in our clinic however, have done as well with voluntary exercises alone as with contractions against resistance.

Unfortunately, perineal exercises will not correct stress incontinence in all patients. Failure is due either to the individual's inability to contract or to anatomic lesions which render the exercises ineffective. In order to evaluate the effectiveness of perineal exercises in the several groups of patients who came to us with stress incontinence, the following classification has been devised.

A. Contractile ability present
   1. No pelvic lesions evident
   2. Cystourethrocele with or without prolapse
   3. Previous vaginal repair
      a. Recent b. Old
   4. Previous vaginal hysterectomy with obliteration of vagina
      a. Recent b. Old

B. Patients without contractile ability
   1. No pelvic lesions evident
   2. Cystourethrocele with or without prolapse
   3. Previous vaginal repair
      a. Recent b. Old

4. Previous vaginal hysterectomy with obliteration of vagina
   a. Recent b. Old

The results of perineal exercises in these several groups may be summarized as follows:

1. Patients without an evident anatomic lesion (urethrocele, cystocele, prolapse) and possessing ability to contract will almost invariably (92 per cent) be cured of stress incontinence by exercise.

2. Eighty-seven per cent of patients who have a urethrocele but no cystocele or uterine prolapse and are able to contract will be cured of stress incontinence by perineal exercises. It was a common observation that there was an increase in the firmness of the suburethral tissues and a decrease in the size of the urethrocele after the patients exercised for some time.

3. Fifty-five per cent of patients with moderate degrees of cystourethrocele and slight uterine prolapse plus the ability to contract will be cured of stress incontinence. Another third will be improved. The remainder of this group derive no benefit from exercises. Regardless of incontinence most cystourethroceles of considerable size and all uterine prolapses should be surgically repaired, unless the patient's general condition precludes operation.

4. Patients who have stress incontinence after a previous cystourethrocele repair fall into several different categories: If the anterior vaginal wall is well supported and the patient has contractile ability she has an excellent (92 per cent) chance of being cured of the incontinence if she will exercise. If, however, the anatomic lesion (cystourethrocele) has recurred then the problem is the same as though she had never been operated. In addition, there is an increased likelihood that there is either a loss of supporting tissue or an inherent lack of tissue tone. She will probably ultimately require an extensive surgical procedure (fascial "sling" operation) before she obtains lasting relief.

5. Extensive vaginal plastic operations with obliteration of the vagina are occasionally required in the treatment of uterine procidentias. Among our patients were eight older women who had undergone such procedures and who had distressing stress incontinence. They all had some contractile ability. All of them overcame their incontinence by exercise.

6. Women who lack contractile ability usually cannot stop the urinary stream until the bladder is empty. They are frequently unable to constrict the anal sphincter. The muscular effort they use in trying to inhibit urination may include the thoracic, abdominal, gluteal and thigh muscles. Occasionally they can educate themselves by practicing interruption of the urinary stream; practice against resistance (an air filled vaginal balloon) has not been helpful in educating those who lack contractile ability.

MANY PATIENTS are unable to learn to exercise but they may develop the ability to contract by muscle reeducation through electrical stimulation. Several of them had been unsuccessfully operated upon a number of times. The inability of these patients to contract their perineal muscles seemed to be

closely related to the inability of any voluntary muscle to contract when partially or completely denervated. It was thought, therefore, that electrical stimulation might develop the necessary muscular structures and, in addition, initiate volitional effort. A modulated sinusoidal current with a carrier frequency of 3 to 25 cycles per second was used. The stimulating electrode was placed in contact with the vaginal mucosa at the level of the musculofascial bundle which is contracted during voluntary perineal exercises. The dispersive electrode was placed beneath the dorso-sacral region. Treatment was given twice weekly to eight patients for five weeks or until volitional contractions could be obtained. Five of the eight patients were relieved of stress incontinence. In a second group of patients, daily treatments were given five times a week for three months. Two thirds of the latter group of patients were relieved of stress incontinence.

While this phase of the problem is still in a preliminary stage we feel warranted in suggesting electrical stimulation as a means of developing volitional efforts in women with stress incontinence who have no ability to contract their perineal muscles.

Patients afflicted with intractable stress incontinence not relieved by vaginal plastic procedures, exercises, muscle reeducation or development through electrical stimulation fall into a special group requiring intricate major surgical technics for relief. Most of these patients will have been operated vaginally several times. The majority of them have a recurrent anatomic lesion with considerable loss of suburethral tissue. In others, the urethra and its sphincter have been destroyed and the reconstructed urethra has little periurethral connective tissue support. In such instances resort is had to some form of the so-called "sling operation," based on the original Goebell-Frangenheim procedure. Although modifications have been devised by Stockel, Aldridge, Millen, Studdiford and others, the essential technic employs strips of abdominal fascia passed retropubically beneath the urethra. These strips, by lifting the urethra upward and behind the symphysis, return it to its original anatomic position. An anterior vaginal wall plastic is carried out coincidentally. The operation devised by Millen creates similar slings which are passed beneath the urethra, the entire procedure being performed suprapubically. In the technic invented by Marshall, Marchetti and Kranz, the space of Retzius is entered suprapubically; silk sutures, lateral to the urethra, are attached to the periostium of the pubic arch and the urethra is drawn upward and anteriorly.

One of us (J.W.H.) has employed the Studdiford modification of the Goebell-Stockel operation in a limited number of cases. Dr. Vincent O'Conor of the Department of Urology has utilized the Millen operation. Our results have been excellent. We feel that operations of this magnitude are not indicated for patients with simple stress incontinence who have not been treated by the usual methods. They should be reserved for very unusual problems where intractable stress incontinence has not yielded to less heroic measures.

DISCUSSION

A PATIENT who has not been previously operated and who has a cystourethrocele and stress incontinence will be best served by surgery. Such a patient should be tested for the ability to contract the connective tissue sling which constitutes the apparatus for the voluntary inhibition of urination. If she is able to contract she may be put on exercises for a period of time preoperatively. The surgery should be some form of anterior vaginal wall plastic. It is essential that the urethra be returned to its anatomically normal location behind and above the symphysis and that the connective tissues of the urethrovaginal septum form a firm shelf beneath it and the bladder trigone. Perineal exercises should begin several weeks postoperatively, be continued regularly for six months, and be used intermittently thereafter.

Perineal exercises have no place in the treatment of cystocele nor in the management of uterine prolapse. They are not a substitute for surgical repair of these lesions. In approximately half of the patients with cystourethrocele, however, exercises will sufficiently strengthen the apparatus for the voluntary inhibition of urination so that the stress incontinence is no longer a factor. They do not, however, correct the cystocele.

There appears to be a definite relationship between the ability to use the apparatus for the voluntary inhibition of urination and the incidence of recurrent stress incontinence. A patient, therefore, who has no contractile ability before operation should be warned that she has some increased danger of recurrent stress incontinence after surgery. Those patients who have good contractility can be given increased assurance of good urinary control after operation provided they will follow the prescribed regimen. During the past two years, in cases in private and clinic practice, there has been an incidence of less than three per cent recurrent stress incontinence after cystourethrocele repairs when the patients have practiced perineal exercises postoperatively. This length of time is admittedly too short to permit a definitive judgment of the ultimate value of the combined procedures. It does, however, offer the best results obtained so far. Despite exercises a certain number of patients will undoubtedly have recurrent anatomic lesions which will eventually lead to stress incontinence.

Perineal exercises have a definite place in the treatment of some forms of stress incontinence. They should be prescribed for those women who have some contractile ability and no evidence of a neurologic lesion or of intrinsic vesical or urethral pathology. They will cure stress incontinence in most women who have a urethrocele without notable cystocele or uterine prolapse. They are of no value in women who can not contract the tissues to be exercised; incontinence in these patients may be due to neurogenic causes, to destruction of muscle, or to psychic factors.

Electrical stimulation for muscle reeducation or development should be given a trial when a patient has no contractile ability and little or no anatomic lesion. If she has been operated vaginally several times without relief electrical

stimulation warrants consideration before surgery is again undertaken.

Most patients who require repeated operations for stress incontinence have a recurrence of an anatomic lesion (giving away of the periurethral supports). In some of these individuals, the lesions are not of great extent; perineal exercises will overcome the incontinence in this group and nothing more needs to be done. Others, however, despite repeated, competently performed vaginal plastic procedures, have recurrent cystourethroceles and incontinence which, despite contractile ability, is not helped by exercises. In this group some form of fascial "sling" operation is usually indicated; operations of this magnitude, however, should be reserved for those infrequent and unusual cases in which other measures have failed. Fortunately, such procedures are rarely necessary.

CONCLUSIONS

THE PROBLEM of stress incontinence should be approached with the realization that the involuntary loss of urine following a sudden increase in intra-abdominal pressure may be a symptom of several different functional or organic disorders. Usually it is evidence of loss of tone or injury of the apparatus involved in the voluntary inhibition of urination. Most often, but not always, women who suffer from stress incontinence have a demonstrable anatomic lesion affecting the supporting structures of the urethra, bladder, and anterior vaginal wall. The lesion permits a dislocation of the normal urethro-vesical-pubic relationship.

The particular therapy directed toward the relief of stress incontinence in the individual patient depends upon the severity of the incontinence, the extent and nature of the anatomic lesion, the patient's ability to use functionally the apparatus for the voluntary inhibition of urination, and the procedures which have already been used for its relief.

While no stereotyped plan for the treatment of stress incontinence can be followed, we have come to the following conclusions regarding therapy in the 225 patients which we have had under our care.

1. Ninety per cent of patients who have no anatomic lesions or only urethrocele will be relieved of stress incontinence by perineal exercises.
2. The majority of patients with cystourethrocele and stress incontinence will be best served by a vaginal plastic operation of the Kelly type followed by perineal exercises. More than 95 per cent of this group will be cured of their incontinence.
3. Patients with uterine prolapse and stress incontinence should have a surgical correction of the prolapse followed by perineal exercises. Exercises will be effective despite obliteration of the vagina.
4. A preliminary study suggests that perineal muscular structures may be developed and volitional efforts initiated by means of electrical stimulation. In selected cases, where the patient has no ability to contract the perineal muscles, electrical stimulation should be given a trial before surgery is undertaken.
5. Fascial sling operations give excellent results but they should be reserved for cases where intractable stress incontinence has not yielded to other less heroic measures. They are indicated in patients in whom stress incontinence has not been relieved by vaginal plastic procedures, perineal exercises or electrical stimulation.

Parenteral Nutrition in Elderly Surgical Patients*

Carl O. Rice, M.D.,† *and J. H. Strickler,* M.D.‡

IT HAS been determined that with advancing age there is a decrease in the rate of protein synthesis; that protein requirements are greater;[1] that carbohydrate metabolism is less efficient;[2] and that rate of oxidation in the tissues is retarded. It has been indicated,[3] however, that few surgical procedures are too hazardous even at the age of 80 if the patient is provided with adequate care before, during and after the operation.

Many of the disturbances in the elderly surgical patient may originate from improperly balanced nutrition in one or more of its multiple phases. The caloric intake is often inadequate and the electrolyte status may be out of balance; the patient may be in a state of acute or chronic dehydration; and he may be suffering from a subclinical vitamin deficiency. Failure to maintain nutritional requirements may court disaster, as shown in the following case report.

A 74-year-old woman entered the hospital with jaundice of short duration. She was in good nutrition. Laboratory studies indicated no inbalances. At operation the common duct was explored and drained.

In the immediate postoperative period she was given 5 per cent glucose in water or 5 per cent glucose in saline. After the first 48 hours she was offered fluid and food by mouth. These she vomited. Nasal catheter suction was instituted and she was again fed with saline and hypertonic solutions of glucose. On three occasions 1.5 grains of potassium chloride was given parenterally. Repeated attempts at taking food by mouth were fruitless in that it continued to cause her to vomit. This condition persisted for approximately three weeks when it became evident that her condition was critical. It was obvious that she had lost a great deal of weight.

An analysis of her fluid intake and fluid output in the urine, gastric suction and bile revealed a consistent negative water balance despite the fact that her urine output of approximately 1000 cc. per day seemed to suggest adequate hydration.

At this point electrolyte studies of the blood revealed uremia (BUN 132 mg. per cent), alkalosis (CO_2 40.7 mEq./1), hypopotassemia (K 2.35 mEq./1), hypernatremia (Na 157.86 mEq./1) and hypochloremia (Cl 95.1 mEq./1). In other words, she was in complete electrolyte, nutritional and water imbalance.

The temperature rose to 105° and she died shortly afterward. The post-

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mortem examination revealed no organic cause for her death although it revealed hydropic degeneration of the kidney tubules and myocardial fibrosis. This finding in the kidney tubules appeared to be similar to the changes which have been observed in hypopotassemic[4] rats.

It is our thesis that tragedies such as these could be avoided if the patient, who cannot eat, is supplemented with adequate parenteral nutrition. Adequate parenteral nutrition implies all of the nutritional elements.

Parenteral nutrition with a solution containing one thousand calories per liter

When the average well individual eats normally, he automatically consumes approximately 45 to 50 per cent of his calories from carbohydrates, 15 to 25 per cent from protein and 30 to 40 per cent from fat. He will consume approximately 2500 calories in 24 hours and he will obtain approximately 2500 cc. of water. He will obtain his vitamins and electrolytes from the food that he eats.

When the individual is ill, the body is in need of all of these nutritional elements. If the patient cannot consume them by mouth he should receive them parenterally.

Accordingly, a solution has been prepared* from invert sugar, protein hydrolysate, ethanol and water as indicated in table I.

TABLE I
ONE THOUSAND CALORIES PER LITER (1 MC/L)

			Proportion of Calories	
	Grams	*Caloric Value*	*This Solution*	*Ideal*
Invert sugar	120	480	48%	45-50%
Protein hydrolysate	60	240	24%	15-25%
Ethanol 50 cc.	40	280	28%	30-40%
Distilled H_2O 1000 cc.				
Total		1000	100%	

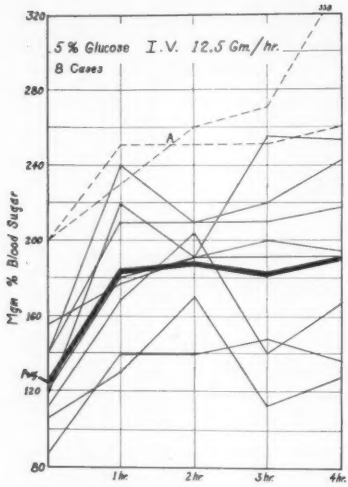
The electrolyte content of this solution has been varied from time to time, but the one that has been used most frequently contained 27 mEq./1 of potassium and 120 mEq./1 of sodium. The other trace elements of electrolytes, which constitute the residue in the amino acids after commercial preparation, have been disregarded in our studies though they, too, may serve beneficially.

One ampule of Pan-vitamins† has been added to one liter of this solution in each twenty-four hour period. Additional sodium and potassium have been added from time to time as indicated. No incompatibility from these additions has been encountered in any instance.

In order to evaluate the effect of this type of parenteral nutrition, each of the nutritional elements has been studied during the period of parenteral feeding.

*Prepared by Baxter Laboratories, Inc., Morton Grove, Illinois.

†Eli Lilly and Company, Indianapolis 6, Indiana.



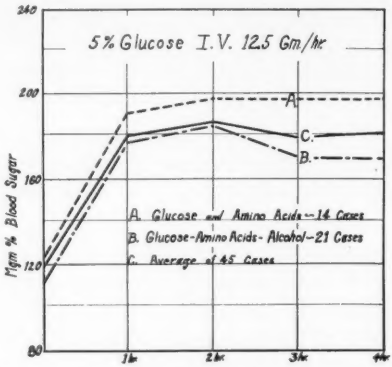


Fig. 1 (left). Blood sugar elevation during the intravenous administration of glucose at the rate of 12.5 g. per hour. Individual determinations and the average are indicated. A represents two cases presenting the blood sugar elevation characteristic of post-traumatic transient diabetic reaction described by Pareira.

Fig. 2 (right). No significant difference is observed in the blood sugar elevation whether glucose is given alone or in conjunction with amino acids and alcohol.

Glucose intravenously

Though Elman[5] has observed that glucose can be given at the rate of .5 g./kg./hr. for a short period of time without significant glycosuria, this relatively large amount of glucose given continuously would probably result in considerable hyperglycemia and glycosuria.

We have observed that when 5 per cent glucose is given intravenously and continuously such that 12.5 grams are administered per hour the blood sugar level rises rapidly to 180 mg. per cent (figure 1). This amount of glucose, represents, on the average, approximately .18 g./kg./hr.

When the same amount of glucose is given intravenously in conjunction

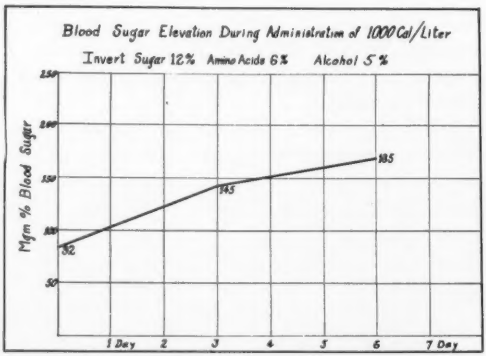


Fig. 3. Blood sugar rise during the continuous administration of invert sugar 12 per cent, amino acids 6 per cent and alcohol 5 per cent, over a period of six days. This represents the average from determinations on sixteen patients.

with amino acids and ethanol, the blood sugar level remains essentially the same as when glucose is given alone (figure 2). We should therefore be able to conclude that the blood sugar elevation during parenteral nutrition is influenced only by the quantity of sugar that is administered.

Invert sugar intravenously

When invert sugar was given intravenously and continuously, as one of the ingredients of the parenteral solution, such that 15 g. of invert sugar was administered per hour, the blood sugar level rose to an average of 165 mg. per cent (figure 3) at the end of the fifth day.

Ethanol intravenously

Our studies indicate that when alcohol is injected at the rate of 20 cc. per hour (8 per cent in saline), the blood level rises rapidly during the first hour to an average of .05 grams per cent. Thereafter the rise in the blood alcohol is less rapid, demonstrating a tendency to level off in each succeeding hour (figure 4).

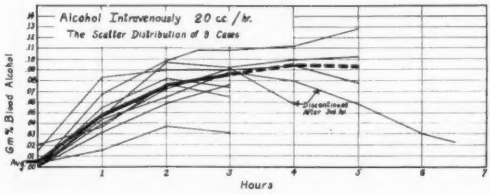


Fig. 4. Blood alcohol level during intravenous administration of 20 cc. of alcohol per hour.

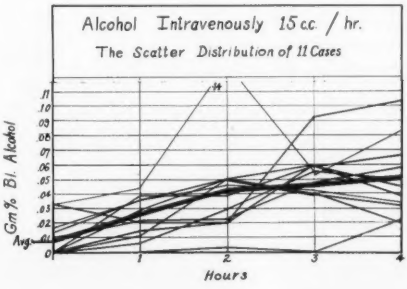


Fig. 5. Blood alcohol level during intravenous administration of 15 cc. of alcohol per hour.

When 15 cc. are given per hour similarly the rise in blood alcohol level is less rapid and the same leveling off of the blood alcohol level is observed in subsequent hours as was observed from 20 cc. of alcohol per hour (figure 5).

The intoxicating level of blood alcohol is considered to be at approximately .150 grams per cent. Sedation occurs when the blood alcohol level reaches .06 to .08 grams per cent.

We have also determined that when alcohol calories are administered at

the same rate as the metabolic requirements of the individual there is no appreciable rise in the blood alcohol level. In other words, if the patient metabolizes 70 calories per hour he can utilize 70 calories of alcohol per hour. This would represent 10 grams of alcohol.

These findings have indicated that alcohol could be administered intravenously to the average individual at the rate of 15 cc. per hour without producing undesirable result.

When a smaller quantity of alcohol is given, as is the case of the solution which has been described here, the blood alcohol determinations from day to day indicate that the blood alcohol level rises inappreciably. There is no suggestion of alcohol accumulation at any time (table II).

TABLE II

BLOOD ALCOHOL LEVEL DURING CONTINUOUS* ADMINISTRATION OF 1 MC/L†

1st day	*3rd day*	*5th day*	*3 days after discontinuing*
.0157 g. %	.0245 g.%	.0230 g.%	.0168 g. %

*These figures represent the average composite determinations from 20 patients.
†1 MC/L—One thousand calories per liter.

Caloric advantage of ethanol

That ethanol can provide caloric advantage is indicated by nitrogen balance studies in which the carbohydrate and protein intake are provided while ethanol is either added or subtracted. When alcohol was added, even though the amino acids and glucose calories were diminished, the nitrogen balance became more positive (table III).

TABLE III

EFFECT OF ALCOHOL CALORIES ON NITROGEN BALANCE

Alcohol Added in Period II

	Period I 4-day average	*Period II 4-day average*
Amino acid calories	585	500
Glucose calories	985	500
Alcohol calories	0	840
Total calories	1570	1840
Nitrogen balance	+.2g.	+3.2 g.

When alcohol calories were removed the nitrogen balance was diminished (table IV).

TABLE IV

EFFECT OF ALCOHOL CALORIES ON NITROGEN BALANCE

Alcohol Removed in Period II

	Period I 3-day average	*Period II 2-day average*
Amino acid calories	600	600
Glucose calories	1000	1500
Alcohol calories	672	0
Total calories	2272	2100
Nitrogen balance	+4.1 g.	+1.1 g.

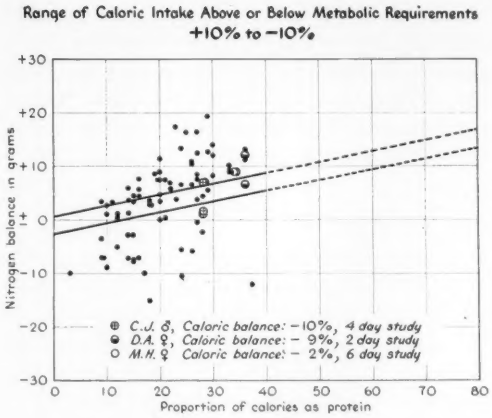


Fig. 6 (Reproduced from Arch. Surg.). The anticipated nitrogen balance with different percentage of protein calories, when the caloric balance is between 90 and 100 per cent.

Nitrogen balance

Nitrogen balance studies and a statistical analysis of the variable factors which were found has revealed[6] that a more favorable nitrogen balance could be obtained by increasing the caloric intake or by increasing the percentage of protein calories.

When the patient receives 100 per cent of his caloric requirement and when 24 per cent of the calories are derived from protein, as is possible with the solution described here, it would be expected that the nitrogen balance should fall, on the average, at approximately +3 grams (interpolate on figure 6), presuming, of course, that the patient is in need of the nitrogen. A well-nourished individual who is not in need of extra nitrogen cannot be made to develop a positive nitrogen balance. Only nitrogen equilibrium will be maintained. This, as well as the wide variation in caloric intake, may account for some of the discrepancies of nitrogen balance studies which have been reported in the medical literature.

Electrolyte pattern of blood during parenteral feeding

The electrolyte status of a group of patients who were maintained on

TABLE V

AVERAGE ELECTROLYTE STATUS OF THE BLOOD DURING COMPLETE PARENTERAL NUTRITION

(Minimum of six patients studied in each item)

	Start	*3rd day*	*6th day*
Hematocrit	45.53	45.57	44.00
B.U.N. mg. %	13.95	14.30	18.00
CO_2 mEq./l	25.90	24.93	27.59
Cl mEq./l	103.56	105.56	100.43
Serum protein	6.56	6.64	6.27
Serum albumin	3.63	3.62	3.11
Serum globulin	2.95	3.02	3.15
Sodium mEq./l	145.61	142.38	141.08
Potassium mEq./l	5.01	4.40	3.94

parenteral nutrition with the thousand calorie per liter solution is indicated by a series of blood analyses on successive three-day periods.

It can be observed from table V that the electrolyte pattern of the blood remained within normal limits. During the period of time in which these patients were maintained wholly on parenteral nutrition the sodium, potassium and chloride intake were considerably more than is needed for maintenance.

Electrolyte excretion during parenteral feeding

In a series of patients in whom electrolyte balance studies were done throughout the pre and postoperative period, it was revealed that the average daily excretion of potassium in the postoperative period was approximately twice as much as was observed in the preoperative period (table VI).

TABLE VI
POTASSIUM EXCRETION PRE AND POSTOPERATIVE

	Preoperative days			*Day of surgery*	*Postoperative days*			
Day	*3rd*	*2nd*	*1st*	*Surgery*	*1st*	*2nd*	*3rd*	*4th*
K. excretion MEq.	33.8	36.6	24.1	51.0	55.5	56.23	51.6	50.1
No. observations	5	6	7	11	13	12	11	7

In a reciprocal manner the sodium excretion was found to be diminished in the postoperative period (table VII).

TABLE VII
SODIUM EXCRETION PRE AND POSTOPERATIVE

	Preoperative days			*Day of surgery*	*Postoperative days*			
Day	*3rd*	*2nd*	*1st*	*Surgery*	*1st*	*2nd*	*3rd*	*4th*
Na excretion MEq.	153.9	191.4	115.4	119.8	99.6	80.9	80.3	73.8
No. observations	5	6	7	11	12	12	10	7

These shifts in the sodium and potassium excretion did not seem to be related to a difference in electrolyte intake in the pre and postoperative period, nor to a change in the caloric intake. The electrolyte and nutritional intake were, on the average, very nearly the same in both periods. These findings correspond to the observations of other investigators.[7, 8] More detailed studies of these findings shall be reported subsequently when sufficient data is obtained to put the figures to statistical proof.

TABLE VIII
THE INCIDENCE OF ELDERLY SURGICAL PATIENTS

Total operations	*65 years or older*	*Operation*	*Per cent of total operations*	*Number of deaths in elderly patients*
131	11	Hernia	8.39%	3 (Strangulated)
90	14	Gall bladder	15.55%	0
64	7	Breast	10.93%	0
39	11	Fractures	28.20%	0
26	9	Colon	34.60%	2 (Obst. and metastases)
30	7	Stomach	23.33%	0
90	4	Miscellaneous		1 (Esoph. strict.-No op. starvation)
244	5	Appendix	2.04%	0
714	68			6

Clinical observations

In a general surgical practice, an analysis of our last 714 operations during a two-year period revealed that elderly patients, 65 years or older, constituted approximately 10 per cent of the total. These figures have been broken down into the following proportions:

The overall hospital mortality in this group of elderly patients was 8.8 per cent. All of the deaths which occurred were in patients who required emergency surgery in which there was no elective period of preoperative preparation.

An analysis of a small group of these elderly patients, in whom detailed balance studies were done, has revealed that it was possible to maintain these patients in caloric, water, nitrogen and electrolyte balance when parenteral nutrition, with the solution containing 1000 calories per liter was the sole source of feeding.

In the eleven elderly patients in this study on whom balance studies were done, the caloric balance averaged 99 per cent and the percentage of calories from protein averaged 20 per cent. The nitrogen balance, averaged for the group, was +1.39 grams per day, corresponding to the anticipated average nitrogen balance as can be interpolated from figure 6. The water balance averaged +69 cc. per day which certainly can be considered to represent equilibrium.

Benefits of adequate parenteral nutrition

In order to determine whether or not there was any difference in the incidence of complications and sequellae in patients who had adequate nutrition, as compared to those who had inadequate nutrition, a comparison was made in two essentially identical groups of patients.[9] It was found that the incidence of complications in the inadequately nourished group was twice as much as in the adequately nourished group (37 per cent versus 17 per cent).

No nausea or vomiting, or other systemic reactions have been observed with the administration of this solution when it is given slowly. No specific contraindications to the use of this solution have been encountered. As soon as these patients awaken from anesthesia and have passed the period of post-anesthetic nausea, they have a feeling of well-being and comfort. They regain their energy quickly and they almost invariably ask for privileges before early ambulation is offered.

A typical response to the use of this type of treatment in the immediate postoperative period can be cited briefly in a case report.

> The patient, aged 40, suffering from obstructive jaundice, had undergone exploration and drainage of the common bile duct about seven weeks previously.
>
> The second operation, a difficult Whipple resection for carcinoma of the ampulla of Vater, performed by Dr. Don McKinnon, was followed by continuous parenteral nutrition with this solution. The solution contained, in her instance, 27 mEq. of potassium and 120 mEq. of sodium per liter. Additional

potassium was given on the third postoperative day. The postoperative convalescence was singularly without event and she was up and about, eating a full diet on the sixth postoperative day.

Method of administration for the solution containing 1000 calories per liter

The solution should be given intravenously perferably through a long polyethylene tube and administered slowly around the clock. It can be given through an intravenous needle, but if extensive extravasation occurs, local redness and soreness develop comparable to that which is observed from 10 per cent glucose. The polyethylene tube can be left in from three to seven days in succession. It is changed to the opposite side at the first evidence of local reaction.

CONCLUSION

Adequate calories and adequate physiologically balanced nutrition with a solution of invert sugar, protein hydrolysate, ethanol calories, electrolyte and vitamins can be given parenterally and safely to the surgical patient unable to eat. This solution can be used either as a supplement to oral feeding, or it can be used as the sole source of nutrition until the patient is again able to eat. A patient can be maintained on this type of feeding without developing clinical evidence of nutritional imbalance.

It has been found in a group of elderly patients that it is possible to maintain simultaneously the caloric, nutritional, water, nitrogen and electrolyte balances with a mixture of invert sugar, protein hydrolysate, ethanol, electrolytes and vitamins.

It appears to us that many of the previous inadequacies of parenteral nutrition[10] have been, on the whole, overcome with the use of this mixture of nutritional elements.

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Aging and Adrenal Cortical Hormones*

Chester Solez, M.D.†

FARBER and his associates, in studying children with Cushing's syndrome, noted that they looked prematurely aged.[1] He also noted an early maturation of sexual function—followed rapidly by a decline in these same functions. Farber's observations of premature aging in children with Cushing's syndrome are worthy of consideration.

Many changes, commonly associated with the aging process, are seen in Cushing's syndrome among chronologically young persons. Hypertension, diabetes, osteoporosis and kyphosis, decreased muscle, protuberant abdomen; also facial hirsutism, thin skin, amenorrhea and impotence often occur in aging and are all well-known signs of Cushing's syndrome.

Although not often stressed in the literature, marked *arteriosclerosis* occurs in young people with Cushing's syndrome, as evidenced in the following case report.

Calcification of pelvic, anterior tibial, posterior tibial, dorsalis pedis, brachial, and ulnar arteries occurred in this 28-year-old patient with classical Cushing's syndrome (figure 1). Pulsations were absent in the posterior tibial and ulnar arteries. The right femoral artery was sclerotic to palpation. There was decreased oscillometric readings in both legs. The left foot became cold easily.

In addition to the wide-spread arteriosclerosis, this patient (figure 2) showed many other changes frequently associated with aging:

Hypertension—Patient first told he had high blood pressure nine months before admission on February 9, 1949. Headache, blurred vision, dyspnea, palpitation, and swelling of the feet for several months. Heart enlarged to the left, aortic second sound accentuated, pitting edema of lower legs, rales at the lung bases, exudates and hemorrhages in both fundi, and albumin in the urine. Blood pressure 190/140.

Diabetes—Polydipsia, nocturia, polyphagia (especially for sweet food) for approximately one year. Up to 40 grams of glucose in 24-hour urine (urinalysis four years previously negative for sugar); diabetic glucose tolerance curve (159 mg. per 100 cc. at 2 hours and 160 mg. at 3 hours); serum cholesterol 299 mg. per 100 cc. and 214 mg. on different days.

Osteoporosis (figure 3)—Severe disabling backache for two months. Tenderness to palpation over vertebrae. Marked demineralization of the spine by x-ray. Development of multiple pathological fractures of vertebrae and ribs.

Kyphosis—Distinct dorsal kyphos with progressive loss in height.

Decreased muscle with weakness—Loss of muscle contour of the extremities with diminished strength; inability to support weight with thigh muscles and necessity of using hands for support in the act of sitting. Marked atrophy of muscle seen at operation. Muscle replaced by fat microscopically. Decreased 24-hour creatinine excretion (0.83 g.) and markedly decreased creatinine coefficient (10.5).

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†Associate, Thewlis Clinic, Wakefield, Rhode Island; formerly senior resident in internal medicine at Veterans Hospital, Buffalo, New York.

Fig. 1. Arteriosclerosis in Cushing's syndrome (patient A. J., age 28) A. Calcification in the ulnar artery. B. Same wrist 3 years previously revealed no arterial calcification (x-ray taken to rule out fracture). C. Foot and ankle showing calcified dorsalis pedis, anterior tibial, and posterior tibial arteries. D. Calcified femoral artery and its branches. E. Calcification of arteries in the pelvis.

The peroneal, brachial, and small arteries around the knee were also calcified, but are not included in the above x-rays.

Protuberant abdomen (figure 2)— Increasing belt size.
Impotence—Decrease in libido and potentia for six months. Genitals somewhat small.
Thin skin—Disease of skin of hands for several years. Easy bruising. Striae present (deeper layers of skin tear on stretching, leaving striae). These purple striae were noted six years before admission.

The patient was treated with testosterone and potassium, then both adrenals were explored. No adrenal tumor was found, and bilateral hemiadrenalectomy was performed. Because the clinical response was only slight, x-ray therapy to the pituitary was given. After this, the following changes were noted: (1) blood pressure decreased substantially, and all signs of heart failure were gone in several months, allowing digitalis to be discontinued; (2) hemorrhages

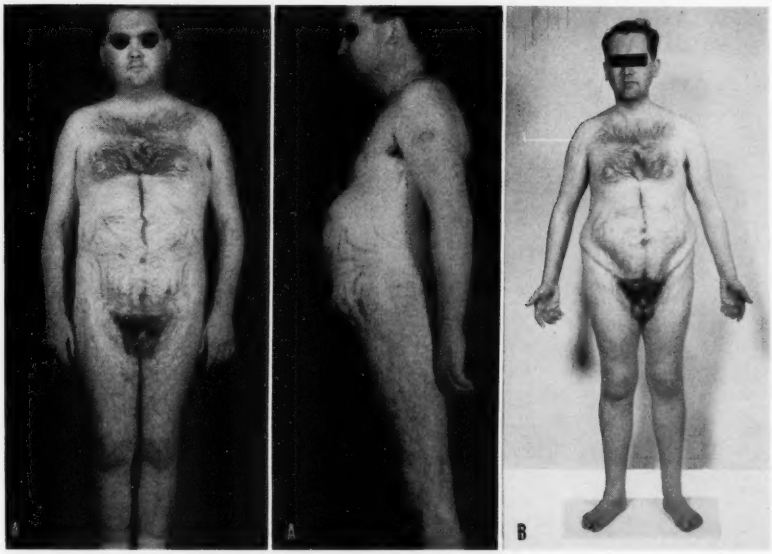

Fig. 2. Patient, A. J. A. Feb., 1949, before treatment. B. April, 1951, after treatment.

and exudates disappeared from eyegrounds; (3) headaches and blurred vision subsided; (4) urine became free of albumin; (5) diabetes disappeared completely; (6) backache decreased and there were no new compression fractures; x-rays of spine suggested improvement in osteoporosis; (7) muscle strength increased as well as the 24-hour creatinine excretion and creatinine coefficient; (8) abdomen became less protuberant; (9) condition of skin on hands improved; (10) ecchymotic bruises no longer appeared; (11) acne disappeared completely; (12) capillary fragility test, which had increased tremendously, returned to normal; (13) fasting eosinophiles and 11-oxysteroids became normal. However, signs of arteriosclerosis and the kyphosis remained unimproved.

Crooke pointed out that there have been four cases of Cushing's syndrome associated with cancer of the pancreas.[2] Three of these occurred in women of 30 or less, an age at which pancreatic carcinoma is very rare. He showed that it was highly improbable that this was merely coincidental association and concluded that in Cushing's syndrome there is a propensity to tumor formation—a suggestion previously made by McLetchie.[2]

MECHANISMS PRODUCING BODY CHANGES IN CUSHING'S SYNDROME AND AGING

THOSE WHO live long enough to grow old certainly have reacted to stress many, many times—and each time there is a secretion of adrenal cortical

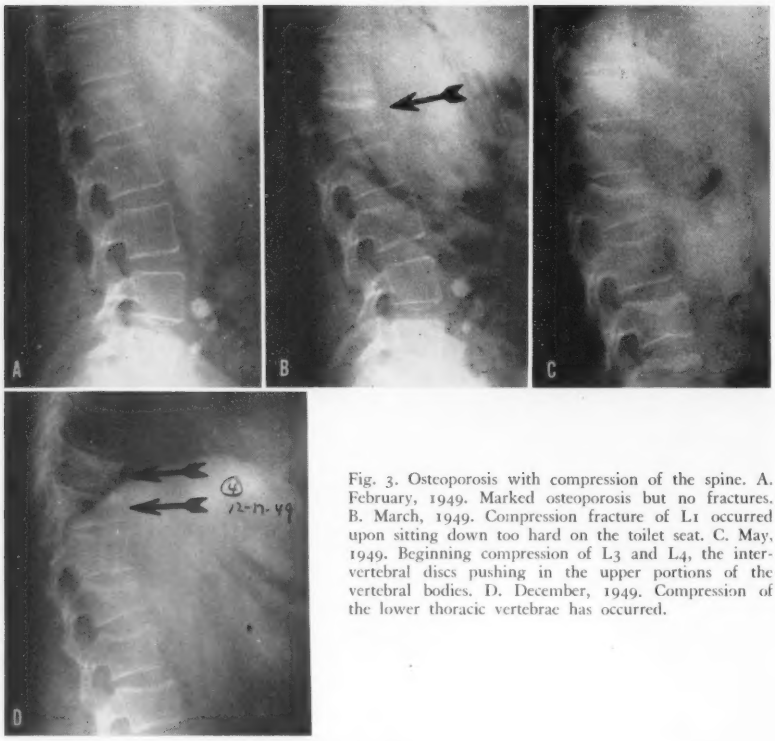

Fig. 3. Osteoporosis with compression of the spine. A. February, 1949. Marked osteoporosis but no fractures. B. March, 1949. Compression fracture of L1 occurred upon sitting down too hard on the toilet seat. C. May, 1949. Beginning compression of L3 and L4, the intervertebral discs pushing in the upper portions of the vertebral bodies. D. December, 1949. Compression of the lower thoracic vertebrae has occurred.

hormones. Therefore there may be a similar pathogenesis involved in the production of some of the diseases of aging and Cushing's syndrome—the common denominator being adrenal cortical hormones.

Arteriosclerosis and adrenal cortical hormones:

The bruisability and increased capillary fragility in Cushing's syndrome are probably due to a weakness of blood vessel walls produced by excess antianabolic hormone from the adrenal cortex. This hormone prevents the synthesis of body protein from protein-precursors,[3] such as amino acids, and may even cause a breakdown of body protein with ultimate formation of glucose. For this reason, it is referred to frequently as the gluconeogenic hormone, glucocorticoid, or "S" hormone of Albright—the "s" standing for sugar production.

In the presence of an excess of this "S" hormone, there is a general wasting of the protein tissue throughout the body—giving rise to thin skin, osteoporosis, and particularly decrease of muscle with weakness.[3] Very likely the protein tissues of the blood vessels, particularly the muscular media of

medium sized arteries, are seriously affected and sclerosis and calcification of arteries may be an attempt to strengthen blood vessel walls when protein is not available.

Although excess "S" hormone prevents proper protein maintenance of blood vessel walls, it does not make calcium unavailable, but causes osteoporosis, releasing bone calcium which may possibly be used to calcify the arteries. Pathologists, discussing medial sclerosis of Monckeberg, said that calcification of the media is preceded by fatty degeneration.[4,5] Thorn and Forsham have shown fatty degeneration in the media of arteries in Cushing's syndrome.[6] To recapitulate: excess antianabolic hormone—wasting of protein tissue in the blood vessels—fatty degeneration—calcification and sclerosis.

Thewlis discussed the anatomic changes called senescent degenerations: "a wasting of tissue which is either not repaired at all or is replaced by a tissue of a different character."[7] He noted that stress "mental, physical, or mechanical" is a causative factor in arteriosclerosis. In both Cushing's syndrome and in aging the muscular media of arteries wastes and is replaced by other tissue. Abnormal production of adrenal cortical hormones may be an underlying mechanism in both cases.

In addition to the adverse effects of excess glucocorticoids, excess DOCA and other naturally occurring mineralo-corticoids have been shown to cause (under certain conditions) hypertensive and inflammatory vascular disease.[8,9] The end stages of inflammation may be scarring and sclerosis—arteriosclerosis.[10]

Finally, adrenal cortical hormones have a definite effect on fat metabolism —either primary or secondary to their effect on carbohydrate and protein metabolism. The buffalo hump at the base of the neck in Cushing's syndrome is probably a fat pad. Central fatty obesity is common in these patients. Chemical studies at the Mayo Clinic have shown an abnormally large proportion of fat in the muscles of patients with Cushing's syndrome. This fatty replacement of muscle can be seen grossly at operation, and microscopically in muscle biopsies. Not infrequently there is an elevated serum cholesterol level in Cushing's syndrome. Cortisone and ACTH can produce an elevation of serum cholesterol.[11] Recently, an autopsy series on children dying after cortisone and ACTH therapy showed an increase of lipoid deposited in the intima and media of the aorta.[12] It may well be that adrenal cortical function, fat metabolism, hypercholesterolemia, and atherosclerosis are all interrelated.

(To be concluded in the September-October issue.)

Abstracts from Symposium on the Experimental and Clinical Aspects of Lipid Metabolism, Arteriosclerosis and the Aging Process*

Edited by Harry E. Ungerleider, M.D.†

Ballistocardiography in Patients With Coronary Artery Disease and in Apparently Normal Persons.

BENJAMIN M. BAKER, JR., WILLIAM R. SCARBOROUGH, M. L. SINGEWALD, R. E. MASON and F. W. DAVIS, JR., *Baltimore, Maryland.*

Recently Dr. Isaac Starr, of the University of Pennsylvania, devised a simple, practical method for studying the mechanical pumping action of the heart and coined the term "ballistocardiography" for this new technique. The ballistocardiograph is a specially designed table on which the patient is allowed to lie at rest. The table moves in response to the movements of the patient's body produced by the pumping action of the heart and the flow of blood. The record of the table's movement, called a ballistocardiogram, furnishes the trained observer information about the character and strength of the heart's beat.

Dr. Starr applied the ballistocardiograph to the study of patients with coronary artery disease and found that their records were frequently abnormal when all other heart tests were normal; these observations have since been repeated and confirmed by others.

We have obtained ballistocardiograms upon 274 patients with either angina pectoris or a history of coronary thrombosis. The records are abnormal in 76.6 per cent of these patients while electrocardiograms are abnormal in only 40.8 per cent.

As a comparison ballistocardiograms have been obtained upon 300 individuals, comparable in age, who have no evidence of heart disease. Thirty-one per cent of those have abnormal ballistocardiograms and 3.3 per cent have abnormal electrocardiograms.

The exact meaning of these findings is not yet known. Final interpretation must await a more thorough understanding of ballistocardiography. The most that can be said at present is that healthy youths have completely normal ballistocardiograms and a high percentage of patients who are known to have coronary artery disease have abnormal ones. Between healthy youths and patients with coronary artery disease stretches the normal population and it is obvious that some of the individuals in this normal population are in the process of developing coronary artery disease. Promising methods for the treatment of this condition make it important to detect these individuals at the earliest possible moment.

Our results indicate that abnormal ballistocardiograms occur in a high percentage of patients with coronary artery disease and that abnormal ballistocardiograms occur more frequently than do abnormal electrocardiograms in such patients. In addition, a small sample of the normal population contains a significant number of persons with abnormal ballistocardiograms. Knowledge of whether those individuals will eventually become heart disease patients must await the results of further research.

*Sponsored by Section Nm of the American Association for the Advancement of Science and the American Geriatrics Society at the annual meeting of the Association in Philadelphia, Pennsylvania, December 29 and 30, 1951.

†Director of medical research, The Equitable Life Assurance Society of the United States.

Arteritis.

DR. RUSSELL L. HOLMAN, M.D., *Louisiana State University School of Medicine, New Orleans, Louisiana.*

The term "arteritis" in the broad sense of inflammation, namely, the reaction of tissue to injury, is applicable to most forms of arterial lesions. The problem resolves itself into the nature and pathogenesis of the injury. Arterial lesions have been produced with regularity by feeding mongrel dogs of either sex and any age a standard high fat diet for eight weeks or longer, then inducing standard renal insufficiency. Simple omission of the fat supplement for one to four weeks eliminated the response of the arterial system to standard renal insufficiency. The lesions developed in the absence of hypertension; and the addition of cholesterol to the diet protected against the lesions. The experimental evidence points to a specific upset in fat metabolism which is more or less independent of heredity, age, sex, hypertension, hypersensitivity and hypercholesterolemia. The primary injury to the arterial wall is caused by the peroxidation of one or more unsaturated fat acids, but before this occurs one or more metabolic "safety valves" has to fail.

There can be no doubt that cholesterol plays a major role in the development of atherosclerosis. There also seems to be no doubt that the body can abundantly synthesize cholesterol and even arterial cholesterol in the absence of an exogenous supply. Indeed, it is difficult, if not impossible, to lower plasma cholesterol values significantly by reducing the dietary intake of cholesterol unless sharp restriction of animal and even sterol-free vegetable fat also occurs.

The suggestions that some accompanying factor in the diet as pyridoxine deficiency, deficient protein intake or dietary phospholipids or lecithin may qualitatively or quantitatively alter hypercholesterolemia deserve additional exploration. The observations that emotional episodes and corticotropin and cortisone administration produce changes in the serum cholesterol levels also must receive more study.

In attempting to determine the significance of variations in dietary intake on the level of the blood cholesterol, it must be recognized that normally considerable spontaneous variation in blood cholesterol occurs and that these fluctuations are particularly labile in subjects with clinical evidence of vascular disease. To ascribe importance to changes in blood cholesterol induced by alterations in the diet, variations of greater magnitude than those occurring spontaneously must be recognized.

Dietary Cholesterol and Atherosclerosis.

CAMPBELL MOSES, M.D., *Addison H. Gibson Laboratory School of Medicine, University of Pittsburgh, Pittsburgh 13, Pennsylvania.*

The current interest in the role of dietary cholesterol in the pathogenesis of arteriosclerosis has been markedly increased by the reports of Gofman implicating certain cholesterol containing lipoprotein molecules in the atherosclerotic process.

Perhaps because of the now incontrovertible evidence presented by numerous investigators over many years demonstrating the relationship between cholesterol and atherosclerosis, many clinicians and not a few investigators have been beguiled into placing similar significance, so far as the development of arteriosclerosis is concerned, on the words "cholesterol" and "dietary cholesterol."

The Biology of Arteriosclerosis.

ELI MOSCHCOWITZ, M.D., *The Mount Sinai Hospital, New York 29, New York.*

Arteriosclerosis must be distinguished from atherosclerosis. Atherosclerosis represents merely a deposition of a fatty substance (lipoid) in the walls of the arteries, while arteriosclerosis, which is far more common, is characterized by a thickening of the walls which consist of an intima (the innermost lining), the elastic coat (the mid-

dle lining), and the muscular coat (the outer lining). This thickening is technically termed hyperplasia and therefore the term hyperplastic arteriosclerosis has been applied. This thickening, that is, hyperplastic arteriosclerosis does not begin in adult life as commonly supposed, but begins at birth and increases progressively with age. Up to about the twentieth year the thickening can be determined only by the microscope; after this year it is visible to the naked eye. Atherosclerosis often follows and is associated with hyperplastic arteriosclerosis, but each may occur independent of the other.

Abundant evidence has been submitted that the thickening of the walls represents a compensatory reaction to the normal arterial pressure. If the pressure is increased the changes occur earlier and are more intense. Thus, it is impossible to tell when normal aging ends and disease begins. Inasmuch as the normal arterial pressure cannot be escaped, it is an inevitable destiny of all animals that possess a vascular system such as the human and who live long enough. Its universality does not imply that clinical arteriosclerosis and anatomical arteriosclerosis are equivalent. Arteriosclerosis causes disease only when the circulation of a vital organ is impaired.

The Aging of Homeostatic Mechanisms.

NATHAN W. SHOCK, *Section on Gerontology, National Heart Institute, National Institutes of Health, Bethesda, Maryland.*

Although many of the disabilities of older people may be attributed to the increased incidences of diseases of the heart and blood vessels, the aging process involves more than these changes. All living things age and die whether or not they have cardiovascular systems. Changes in individual cells and tissues occur with advancing age. For example, the enzyme systems of specific cells of the body become less effective and active in older animals. In higher animals, including man, the cells of the body are exposed to blood and tissue fluids which must be maintained within fairly narrow limits of chemical composition.

The regulation of the chemical composition of the blood and body fluids is termed "homeostasis." With increasing age the homeostatic abilities of the organism are reduced. Although this is partly due to impaired circulation, there are other factors involved, such as cellular metabolism and the ability to integrate the activities of different organ systems of the body. Specific examples of age changes in the regulation of the sugar concentration and the acidity of the blood are given. One of the characteristics of aging is that more time is required by the aged person to adjust to physiological stresses.

Body Composition With Special Reference to Fat and Water Content.

J. MURRAY STEELE, M.D., *New York City.*

A simple method for measuring total body water in living man has been developed, based on dilution of antipyrine by the water of the body, throughout which this substance is evenly distributed. The method was shown to agree well with dilution of deuterium oxide in the body. Measurement of body water was made in 82 subjects (51 males and 31 females) ranging from 21 to 96 years of age. The proportion of water in men varied from 40 to 68 per cent of body weight and averaged 53 per cent; in women, from 30 to 53 per cent, with an average of 45 per cent. These figures were lower than was generally thought to be the case, so low, in fact, that when the volume of extracellular fluid as measured by dilution of thiocyanate or bromide was subtracted from total body water, the remainder for intracellular was so small as to be incredible.

Since chloride (and hence bromide) is known to enter certain cells of the body, the dilution of inulin was taken as a measure of extracellular fluid.

Inulin is a non-ionic compound of large molecular size, which is known not to enter either the red blood cells or the renal tubular cells and presumably does not enter other cells of the body. The inulin space was found to be roughly half the bromide space, 15 per cent as against 28 per cent body weight. Use of this figure for extracellular space gave a reasonable figure for intracellular water and in round numbers the main constituents of the body appear to be: fat, 20 per cent; solids, 20 per cent; total water, 60 per cent (intracellular, 45, and extracellular, 15 per cent) of body weight.

Etiologic and Pathogenic Factors in Experimental Arterial Disease.

L. L. WATERS, M.D., G. T. DE SUTO-NAGY, M.D., and W. B. MACALLISTER, M.D., *Department of Pathology, Yale University School of Medicine, New Haven, Connecticut.*

New methods are available for the production of selective necrosis of the coronary and other arteries of dogs. These methods include intravenous injection of allylamine, hypertension produced by injection of epinephrine or other amines, and the rapid infusion of compatible blood. The lesions are fully developed in a matter of days. The availability of these methods has made possible a study of the fate and transportation of lipids in the vessel wall in relation to arterial injury.

It has been ascertained that blood fat, arising from injection or feeding, localizes selectively at the site of arterial injury. This localization is only temporary and the resulting lesion does not reproduce the early changes of arteriosclerosis. When the animals' own blood lipid pattern is altered by the feeding of toxic quantities of viosterol in combination with thyroidectomy, fatty lesions of acutely injured arteries appear that reproduce many of the changes of early arteriosclerosis. Similar lesions are more easily and rapidly produced in the allylamine-injured coronary arteries of dogs by altering the endogenous blood lipid pattern through the injection of detergents.

The injection of methyl cellulose in small quantities into dogs with injured coronary arteries demonstrates the dependence of the methyl-cellulose, foam-cellular arterial lesions on primary arterial injury. Simultaneously with the deposition of methyl cellulose in foam-cells in areas of arterial injury, quantities of lipid are also found in these foam cells. The possibility that naturally occurring, non-fatty, large molecular substances may influence the localization of lipids in the arterial wall is suggested.

Essential Familial Hypercholesterolemia: Cutaneous, Metabolic and Hereditary Aspects.

CHARLES F. WILKINSON, JR., M.D., *Department of Medicine, New York University Post-graduate Medical School, New York City.*

Essential familial hypercholesterolemia, an inherited disease, may manifest itself in two forms. In the most severe form, there are fatty tumors of the tendons and under the skin of the elbows, knees, etc. These fatty tumors are called "xanthoma tuberosum." In the milder form of the condition, it can only be detected by a chemical determination of the blood cholesterol. Cholesterol is one of the important fats in the body and is present in all cells of the body. One of the important results of this study was the establishment of the normal limits for blood cholesterol by the genetic pattern of transmission.

The more severe form of this disease is of special importance because the people with it are subject to early atheromatosis and resulting heart disease. Genetic studies such as this are extremely important in finding the carrier state for certain inherited diseases. Here, the individual affected may himself suffer no ill effects but, if an unwise marriage is entered into, it is possible that many of the children may be severely affected.

GERIATRICS

Official Journal of the
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Geriatrics, a Specialty?

SOME physicians are doubtless asking themselves and others, can a man limit his practice to diseases of the aged? Or should he try to do it?

In order to become a simon-pure geriatrician one would have to be located in a good-sized city to get enough patients of the one type. The geriatrician might be handicapped by the fact that half or more of his elderly patients, when ill, would have to be seen in their homes. Thus, the specialist would have to be doing a sort of general practice also.

In many ways the best man to become a geriatrician is the general practitioner. However, the geriatrician must always be a good internist and diagnostician. So often when an older man or woman begins to fail in health, it is far from easy to find the small cancer, or the old focus of tuberculosis that has become active again, or the artery that has plugged up in a silent area of the brain, or the aneurysmal wall that is beginning to get dissected, or the mesenteric artery that is beginning to plug up, or the diverticulum of the colon that has grown as a fistula into the bladder, or the large gallstone that is working its way into the bowel. To find such things the physician must have a high degree of diagnostic skill such as comes only after years of experience in the consultant practice of internal medicine.

The man who would be a geriatrician must be a good cardiologist and he must know well the physiology of aging kidneys. He must know much about the handling of the man with an enlarging prostate gland or a woman with a bladder that leaks a bit with every cough or sneeze. He must know well the troubles that come with advancing arteriosclerosis, particularly in the brain. He must recognize the "little strokes" with all the bizarre syndromes that they produce. He must be a bit of a dermatologist because of the many keratoses and pre-cancerous lesions which his older patients are constantly developing. He must be capable in the field of the arthritides, because, goodness knows, he'll see enough of crippled and aching joints! He will have to

know much about failing eyes and ears, and about ruptures and trusses. He will have to know all about hypertension, diabetes, emphysema and obesity. He will have to have good judgment when it comes to either letting an old man be operated on, or staying the surgeon's hand.

Finally, the geriatrician must be a good, kindly, sensible and wise psychiatrist who will help the families of his patients when grandfather starts setting fires, or grandmother starts walking through the house all night wringing her hands in an agitated depression.

All of which means that in the practice of geriatrics, just as in the practice of pediatrics, or internal medicine, surgery, roentgenology, or perhaps any specialty, the man who wants to be a master of his subject and a teacher of it, must study the many phases of it and he must keep studying all his life. He will not be a geriatrician just because he has printed that word on his cards.

WALTER C. ALVAREZ, M.D.

*Cerebral Physiology of the Aged**

CEREBRAL blood flow is markedly reduced in the presence of various clinical manifestations of cerebral vascular disease. In patients manifesting cerebral symptoms, the cerebral blood flow is significantly lower than in elderly persons without cerebral arteriosclerosis. In the latter group it is assumed that such pathology is present in view of an increased mean cerebral vascular resistance and decreased mean cerebral flow compared to younger, apparently normal individuals. The ranges of normality and abnormality overlap and for that reason individual determinations are of questionable value in establishing cerebral hemodynamic abnormality.

The mean levels of cerebral oxygen consumption of elderly persons with or without evidence of central nervous system vascular disease is significantly reduced from that of younger subjects but has little relationship to the clinical manifestations. Elderly patients with or without mental changes show little difference in oxygen consumption but do show a significantly reduced value than which is normal in the younger person.

A decrease in cerebral metabolic rate is due either to a curtailed availability of nutriments to the cerebral cells or to failure of utilization of nutriments due to depression of enzyme activity. A diminution in oxygen availability or a primary disturbance of cerebral enzyme activity are the only explanations for decrease in cerebral metabolic rate noted routinely in elderly patients. Oxygen availability depends upon the quantity of oxygen delivered to the tissues which is in turn dependent upon velocity of blood flow, concentration of oxygen in arterial blood, intracellular oxygen tension, and permeability of the blood-brain barrier. The oxygen used therefore can at best only approach oxygen delivery. The considerable reduction in mean cerebral blood flow seen in the elder age group requires an inversely proportional increase in mean arterial oxygen content in order to maintain the same mean rate of cerebral oxygen delivery as in younger persons.

*JOSEPH F. FAZEKAS, M.D., RALPH W. ALMAN, M.D., and ALICE N. BESSMAN, M.D.: Cerebral physiology of the aged. Am. J. M. Sc. 233: 245-257, 1952.

*Socio*medical Progress

Devoted to constructive correlation between sociological and medical problems in the aged . . .

Improving Health Care in Private and Public Nursing Homes*

L. E. Burney, M.D.,† *and Martha O'Malley*, M.D.‡

INTEREST in and concern over institutional care of the aged have been stimulated by several factors: First, the average age of the population and the number of individuals in the older age groups have increased. Secondly, chronic illnesses have had their greatest incidence among older people. Thirdly, successful efforts to prevent and control infectious diseases have focused attention upon the importance of chronic diseases as major causes of death and disability and the need for a concerted attack upon them. Fourthly, as the demand for hospital beds for acute illness has exceeded the supply, an awareness has arisen that many hospital beds are filled with chronically ill aged persons. Fifthly, it has become apparent that there are insufficient institutional facilities for the aged, many of whom are ill or disabled. Sixthly, the number of private nursing homes has increased tremendously to supply the demand, established in many instances without benefit of licensure and minimum standards, with consequent low standards of care.

Thus, doctors, welfare officials and social workers are impressed with the difficulties in securing institutional care for aged persons who are economically dependent; hospital administrators are anxious to place aged chronically ill patients in order to free beds for acute disease; and public health workers are concerned first because of their responsibilities in problems of the aged, including chronic diseases, and secondly because they are required to assume inspection and approval of such institutions.

Institutional care of the aging is not a new problem to any of the professions or agencies concerned, but the increasing importance of such care must be recognized. Critical evaluation of and sound planning for existing and future needs are necessary. The program calls for redirection of personnel and energies in the field of health from the acute infectious diseases

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to nursing home care and other basic issues created by an aging population and concurrent chronic illness. A large number of these individuals do not require hospitalization but cannot remain at home. Nursing homes, private and public, should provide care for such persons and should maintain reasonable standards to safeguard their health and welfare.

Institutional licensure and approval programs afford one of the most effective measures to assure that institutions do maintain reasonable standards. There has been a definite trend in this country for states to enact laws requiring licensure of hospitals and nursing homes. This trend was stimulated by the enactment of the Federal Hospital Survey and Construction Act which requires the state to establish minimum standards of maintenance and of operation for hospitals built with federal funds under the program. This trend will be further accelerated by the provision of the Social Security Act which becomes effective July 1, 1953, to the effect that if payment is made to individuals in private or public institutions, a state authority will be designated to be responsible for establishment and maintaining standards for such institutions. This will bring new responsibilities to some states. Others have the responsibilities for approval or licensing of public and private nursing homes under established laws and regulations.

The responsibilities of the state board of health in licensing and approval of institutions are, of course, in the field of health and environmental sanitation. Experience may be gained by working with public welfare agencies in the approval of county homes for care of assistance cases, and in the administration of a program for licensing and regulating of all general and special hospitals except those for mental patients.

PHILOSOPHY OF ADMINISTRATION

It has been our experience, for the most part, that operators of institutions are sincere, well-intentioned individuals who desire to do a good job. They sometimes fail because of the lack of awareness or the lack of understanding of problems, or because of limited personal preparation or ability to cope with the situation. It is true that dishonest and unscrupulous operators exist, but fortunately, very rarely. Therefore, since the philosophy of administration should be directed toward the majority of institutions, the program should be one of education and assistance, rather than one of police compulsion. Police methods should be resorted to only when all other methods fail.

REGULATIONS AND STANDARDS

Standards and regulations should be in the form of basic principles rather than an outline of specific details. The application of such principles will allow for flexibility and encourage individual variation to meet particular situations.

SURVEY PROCEDURE

1. In surveying the degree of compliance with regulations, it is essential that the interviewers, by reason of their training and experience, assist the operators of the institution to comprehend existing problems, to understand the basic reason for the problems, and to assist them to work out a plan for their correction.

2. Meetings with nursing home operators and officials responsible for the institutions following the survey are helpful. We have found in Indiana that it is helpful to the persons responsible for the administration of institutions to meet with representatives from the three state agencies—the department of public welfare, the state fire marshal department and the state board of health—in order to arrive at complete understanding and results in an over-all plan of improvement which will meet the needs of the institutions.

ASSIGNMENT OF PERSONNEL

A number of persons with different professional backgrounds are utilized

for survey and consultation work in our various licensing and approval programs. In the past, a set pattern has been followed for all institutions of the same type. For instance, in our first year's study of county homes, all institutions were studied by a physician and a sanitary engineer. At the present time, a plan has been devised to carry out our activities in regard to county homes through the five branch offices of the state board of health. These offices are staffed by sanitary engineers, public health nurses, nutritionists, food sanitarians, milk sanitarians and health educators. The staffing plan calls for a medical director for each branch. The function of surveys, consultation, follow up, institutional and community education on the health aspects of county homes has been delegated to the branch offices.

Approval of the health program and environmental sanitation of these institutions is granted through the state health commissioner's office on the basis of the recommendations from the branch offices. The central staff works with the branch offices in an effort to develop a program sufficiently flexible to meet the needs of each institution. For instance, the staff analyzes and appraises each of the institutions under its jurisdiction. The basic problems are determined and a plan with definite priorities is adopted for solving these problems. The assignment of personnel for surveys, consultation and other assistance to the institutions is based on the particular needs of the institution.

STATISTICAL EVALUATION OF SURVEY RESULTS

A statistical device which is applicable in any licensing or approval program, is a profile of the institution. The profile consists of a graph showing the institution's compliance with each specific regulation and compares the institution with all others in the same size group. An institutional profile has the following advantages:

1. It is an administrative tool for presentation of information to the advisory council or official board of the licensing agency when applications for licensure are considered.

2. It is an educational medium used to help operators and boards of institutions understand their problems within their own institution and to determine their level of comparison with other similar institutions.

3. It is an evaluation of the effectiveness of the licensing agency's work in measuring the improvements in institutions from year to year.

The statistical evaluation, in addition to providing a graphic portrayal of each institution, provides a means of obtaining a composite picture of all institutions. This information is of value to professional groups—such as the medical and nursing personnel, social workers, and the nursing home associations—in developing programs of assistance to their members and in working out their plans for meeting their responsibilities for providing care in institutions.

INSTITUTIONAL PROBLEMS

In our work with county homes, and in our limited experience with nursing homes, there are certain common basic problems. These appear to be as follows:

1. Lack of a definite plan for care of chronic disease patients in the different age groups on a state, regional, and local basis, with the function and scope of the various institutions defined.

2. Lack of community understanding and support of the county homes and of nursing homes.

3. Lack of a representative group of citizens to work with administrators of the county homes and the operators of nursing homes on policies and programs for care in these institutions.

4. Need for the administrators of the county homes and the operators of nursing homes to have an understanding of program planning and the needs of chronic disease patients. It is conceivable that in many areas county homes and nursing homes could be

On the subject of "meat" in the diet

one recipe

MEAT PIE...
Gerber's Style

1 can Gerber's Junior (Chopped) Beef, Veal or Liver

1/2 cup mashed potatoes (add seasoning if diet permits)

Butter a small, individual casserole. Place 1/2 of the mashed potatoes in bottom of the casserole. Top with the chopped meat. Spoon remaining half of the mashed potatoes in mounds around the edge of the casserole, leaving a little of the meat showing. Bake in a moderate oven (375°) until top is lightly browned.

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affiliated with the community hospitals. It should be possible for the hospital administrator to supervise the administration of the county home and perhaps the nursing home.

5. Need for supervision of nursing care by qualified registered nurses. The actual nursing care in most county homes and nursing homes can be given by trained practical nurses.

6. The dietary service and the meal planning should be under the supervision of a trained dietitian. The need for a well-balanced diet prepared in a form that can be eaten by aged and chronically ill patients is a major need of county homes and nursing homes.

7. There is almost a complete absence of physiotherapy in county homes and nursing homes. This service, provided with the cooperation of the medical staff, could do a great deal to rehabilitate many people in these institutions to self-care and, perhaps, to the performance of useful tasks for recreational or occupational purposes. The physical therapist from the local hospital or other community agency could do a great deal on a part-time or consultation basis.

8. There is very little effort made to keep the people in county homes or nursing homes occupied. A properly planned vocational, occupational and recreational program suitable to the various persons in county homes and nursing homes would be materially beneficial. Again, the specialists in these fields would need to be secured on a consultation or part-time basis from the surrounding hospitals or other community agencies that provide these services.

9. At the present time, a limited amount of medical care is provided these patients, and such care is usually on the basis of individual need rather than on a definite plan of supervision and care. The cooperation and interest of medical societies must be secured in developing good medical programs in these institutions. Regular medical care and supervision of the individual patient as well as cooperation in program planning on the part of the medical staff with the administration and other personnel are essential.

10. There is a need to improve the physical structures to provide good environmental sanitation and to modernize utilities and service facilities in a great many of these institutions. In addition, steps to insure a safe milk supply are necessary in many of these homes. While these physical improvements are costly, it has been found that they are much easier to obtain than the ones relatively inexpensive which relate to professional care and services.

It may seem too idealistic to expect that professional services mentioned might be made available to county homes and nursing homes. However, unless these services are made available on a well-planned though limited basis, the people in these homes will receive only domiciliary care. In a few communities hospital services are brought to the individual patient's home. It should be possible for the hospital to provide the same services to the nursing home.

COMMUNITY EDUCATION

A program for community enlightenment on the problems and needs of the older age persons and the necessary institutional facilities to provide proper care for them is essential in improving the standards of the institutions and care of the residents. The official licensing and approving agencies are in a position to define the common problems and needs and to cooperate with interested professional and citizen groups in studying the problems and in developing plans and programs for meeting them. There are many channels to reach the citizens of a community in regard to their institution. One approach is through the advisory boards of the institutions. Another important avenue of community education is through the county health council. This council consists of a group of representative citizens which studies community health needs and initiates program to meet these needs.

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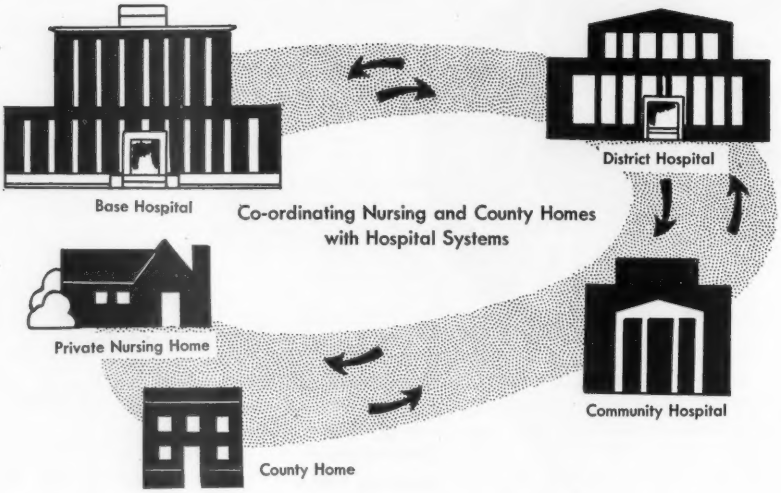

Fig. 1. Schematic illustration indicating the flow of services from the base to the district to the community hospital to the private nursing home and county homes. It also indicates a flow upwards from the private nursing home to the county home through the various hospitals. This would be primarily for patients securing hospital diagnostic, consultative and treatment services.

RECOMMENDATIONS

1. A comprehensive evaluation of present health needs of older age people and a plan based on the needs should be made. The plan should include an allocation of public and private nursing home beds based on realistic criteria of need for these facilities and on the proposed over-all program of care. The plan should define the scope and function of private and public nursing homes and should suggest close cooperation and interrelationship with the hospital system. It is necessary that this over-all plan be developed before licensing agencies progress with regulations, since requirements should be directed to the program of patient care the institution is expected to carry out. Such a plan which would define the need, size, and type of facilities needed in various areas would be very helpful to individuals, groups, and community officials interested in establishing public and private nursing homes. This plan would be helpful to operators of existing institutions in evaluation of their present program and as a guide for further expansion.

2. The development of a model set of regulations and standards for public and private nursing homes should serve as a guide to states and countries in working out their own licensing or approval requirements.

3. The establishment of personnel specifications should include experience, training and personal qualifications to aid persons charged with the responsibility of administering licensing and approval programs in selecting staff members.

4. Special training programs should be established for licensing agency personnel. Training programs should provide background information in survey techniques, consultation procedures, educational methods, measurement of compliance with regulations, and means to obtain compliance.

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GERIATRICS

Current Therapy, 1952

Edited by Howard F. Conn., M.D., and twelve consulting editors. Philadelphia: W. B. Saunders Co. 849 pages. $11.00.

The fourth volume of Current Therapy, that for 1952, conforms to the pattern begun in 1948. Under the direction of Howard F. Conn, a board of consulting editors, each distinguished in his field, assigns topics to more than 350 practitioners and teachers in all parts of the country. The group of contributors changes from year to year. On some subjects, several therapeutic regimes are published. This method of assembling material assures complete coverage, annually, of all practical methods of treatment of every disease likely to be encountered by the general practitioner.

The therapy recommended is not that which may be on trial at the moment, but that which has proved satisfactory by the particular author. A reader of 1952 Current Therapy may use the recommendations with confidence that as of the time of reading, the suggested measures are the best known.

JAMES B. CAREY, M.D.,
Minneapolis, Minnesota

The Clinical Use of Fluid and Electrolytes

John H. Bland, M.D., assistant professor of medicine, University of Vermont College of Medicine, 1952. Philadelphia: William B. Saunders Company. 259 pages. $6.50.

This is an excellent treatise, and is a valuable supplement for anyone interested in learning basic principles of the fluid and electrolyte problem, now such an important phase of the pre- and postoperative care of surgical patients. The electrolyte composition of the various fluid spaces of the body are well illustrated and detailed.

The subject of fluid and electrolytes has been taught in the medical schools only in the past few years and for those doctors who did not obtain this training, this monograph serves as an excellent aid in obtaining this newer information.

For the internist there is a chapter dealing with water and electrolytes in congestive heart failure. There are also chapters dealing with the problem in renal disease, and in diabetes, one as it pertains to the pediatric patient, and one as it relates to the aged patient.

Surgeon, internist, pediatrician, and general practitioner should obtain a great deal of valuable information from this monograph.

CARL O. RICE, M.D.,
Minneapolis, Minnesota

Book Reviews

Special Vector Electrocardiography: Clinical Electrocardiographic Interpretation

Robert P. Grant, M.D., National Heart Institute, Bethesda, Maryland, and E. Harvey Estes, Jr., M.D., U. S. Naval Hospital, Bethesda, Maryland, 1951. Philadelphia: The Blakiston Company. 149 pages, $4.50.

The use of vector methods in electrocardiography is not new although it is only in the last decade that a renewed interest has been taken in the subject of vectorcardiography.

The authors' object in this volume is to indicate how vector principles can be applied in the clinical interpretation of the electrocardiogram.

The book is divided into two parts: Part I discusses the spatial vector method of interpretation; Part II takes up the clinical application of the spatial vector method. It is not a textbook of clinical electrocardiography as only the ventricular electrocardiogram is considered. For those interested in learning more about vector methods in electrocardiography the work should be of popular interest.

THOMAS ZISKIN, M.D.,
Minneapolis, Minnesota

Biological Antagonism

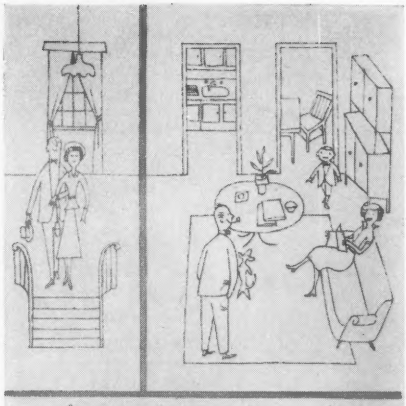
Gustave J. Martin, 1951. Philadelphia: The Blakiston Company. 516 pages, 64 figures. $8.50.

A metabolic antagonist (referred to also as antimetabolite, enzyme antagonist, and competitive antagonist) is a substance which tends to replace a necessary constituent of a normal metabolic process (essential metabolite). Thus the reaction between acetylcholine and phosphocreatine, involved in the release of energy required for the transmission of nervous impulses, may be blocked by procaine. Consequently, the local anesthetic action of procaine may be regarded as a manifestation of biological antagonism.

The principle of competitive inhibition (inactivation) of specific enzymatic reactions, based on the metabolite analogue approach, underlies a good deal of modern medicine. Nevertheless, the author believes that "in no instance of specific displacement has a thorough job been done, and that such work, properly undertaken, will lead to discoveries of chemotherapeutic agents of great value in medical science."

The volume falls naturally into two parts. Chapter 1 (inhibition of enzyme action by chemicals structurally related to the natural

(continued on page 263)



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(continued from page 261)

substrate) and chapter 22 (general comment) contain the fundamental ideas concerning "the rational approach to chemotherapy." This approach if based on the concept of metabolite analogues and the principle that inhibitory power of a given antimetabolite is a direct function of the effects on the rate of a particular enzymatic reaction. Immunology is considered as a subdivision of the science of biological antagonism and pharmacology is largely an application of this principle. The body of the volume consists in a detailed review of the literature on metabolite analogues.

JOSE F. BROZEK, Ph.D.,
University of Minnesota

CORRECTION

In the paper "Preoperative Preparation and Postoperative Care of the Aged" by Dr. Francis F. Foldes, which appeared in the May-June 1952 issue of *Geriatrics*, the sentence on page 170, beginning on the seventh line under the subheading "Prevention of circulatory complications" should read: "Carp[9] states that cardiac dilatation was one of the principal causes of death in 27 per cent of 100 consecutive autopsy protocols in patients 60 years and over who died within 1 month after operation. Seven per cent of the remaining patients died of thrombosis and embolism and 3 per cent of coronary occlusion."

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1. National Research Council. The composition of milks. Bulletin No. 119, Washington 1950.

2. Collins, R. A., Harper, A. E., Schrieber, M. and Elvehjem, C. A. The folic acid and vitamin B_{12} content of the milk of various species. J. Nutr. *43*:423 (Feb.) 1951.

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4. Stearns, C. Human requirements of calcium, phosphorus, magnesium. J. Am. Med. Assn. *142*:478 (Feb.) 1950.

5. Mills, R., Breiter, H., Kempster, E., McKey, B., Pickens, M. and Outhouse, J. The influence of lactose on calcium retention in children. J. Nutr. *20*:467 (Nov.) 1940.

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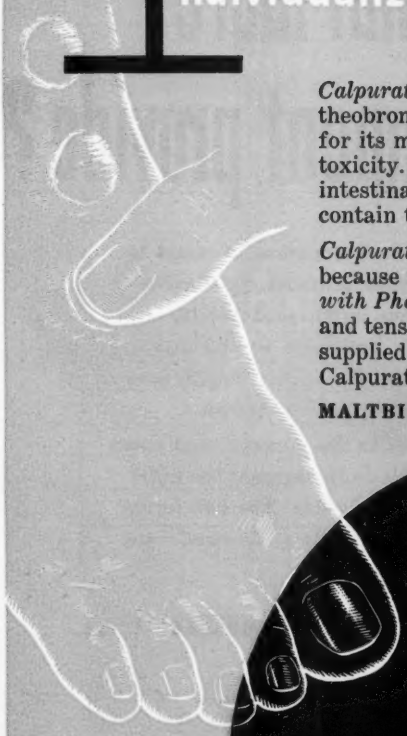

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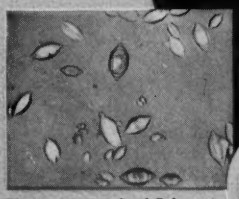

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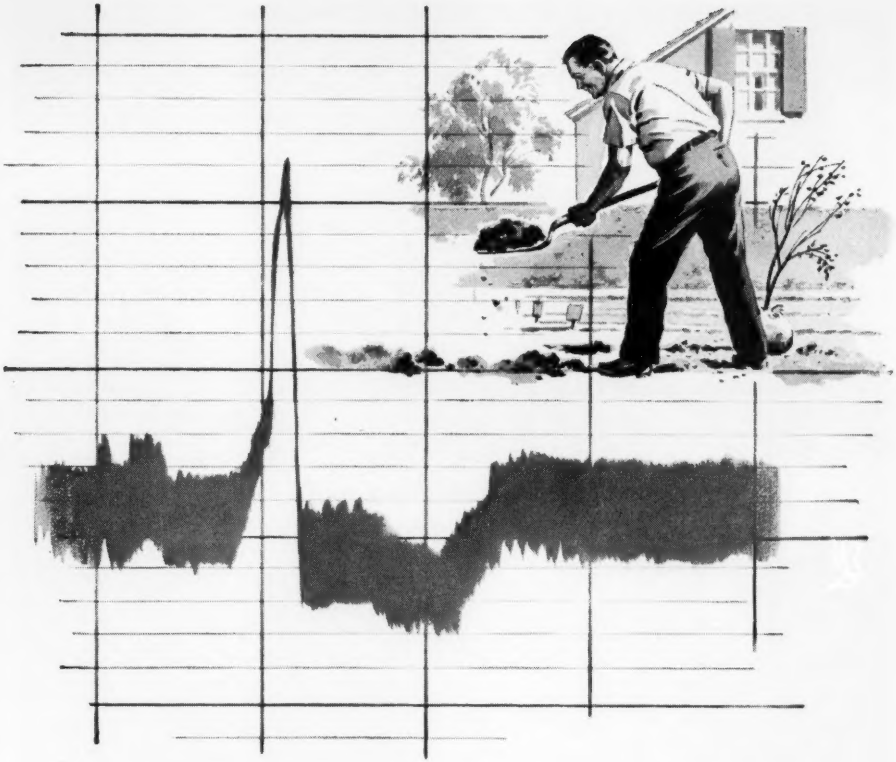

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A self-acidifying methenamine urinary antiseptic permitting high dosage without toxicity. Quickly soothes inflamed mucosa. Bacteriostatic against E. Coli, S. Albus, S. Aureus. Requires no periodic blood tests, etc. May be prescribed alone or with suitable antispasmodics and sedatives as individually required—tr. belladonna, tr. hyoscyamus, phenobarbital, etc. Especially useful for older patients.

(*Sample Prescription*)

℞ Tr. Belladonna ℥ii
Urolithia qs. ad ℥viii
Sig ℥ii 2 P.D. c cup
warm water ½ hr. AC.

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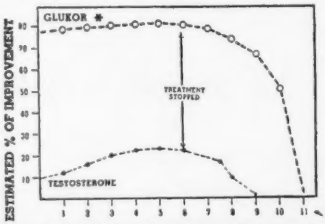
Announcing

Glukor*

*Trade mark and patent pending

Fortified Pituitary Gonadotropin



Reprinted from "Medical Times" March 1951, page 16.

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FOR TIRED OLD MEN IN MALE SENILITY

FOR TIRED YOUNG MEN IN MALE CLIMACTERIC

Each cc. contains Choronic Gonadotropin, 200 I.U.; Thiamin Chloride, 25 mg.; L (+) Glutamic Acid, 52.5 ppm.

Supplied in 25 cc. ampule vials.

Dose is 1 cc.

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Please send me reprints and professional literature on Glukor.

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From the literature: "Superiority of Glukor was noted in a series of 120 cases of male climacteric (ages 40 to 60)." [1]

"Showed considerable improvement in 237 cases of male senility (ages 60 to 102)." [2]

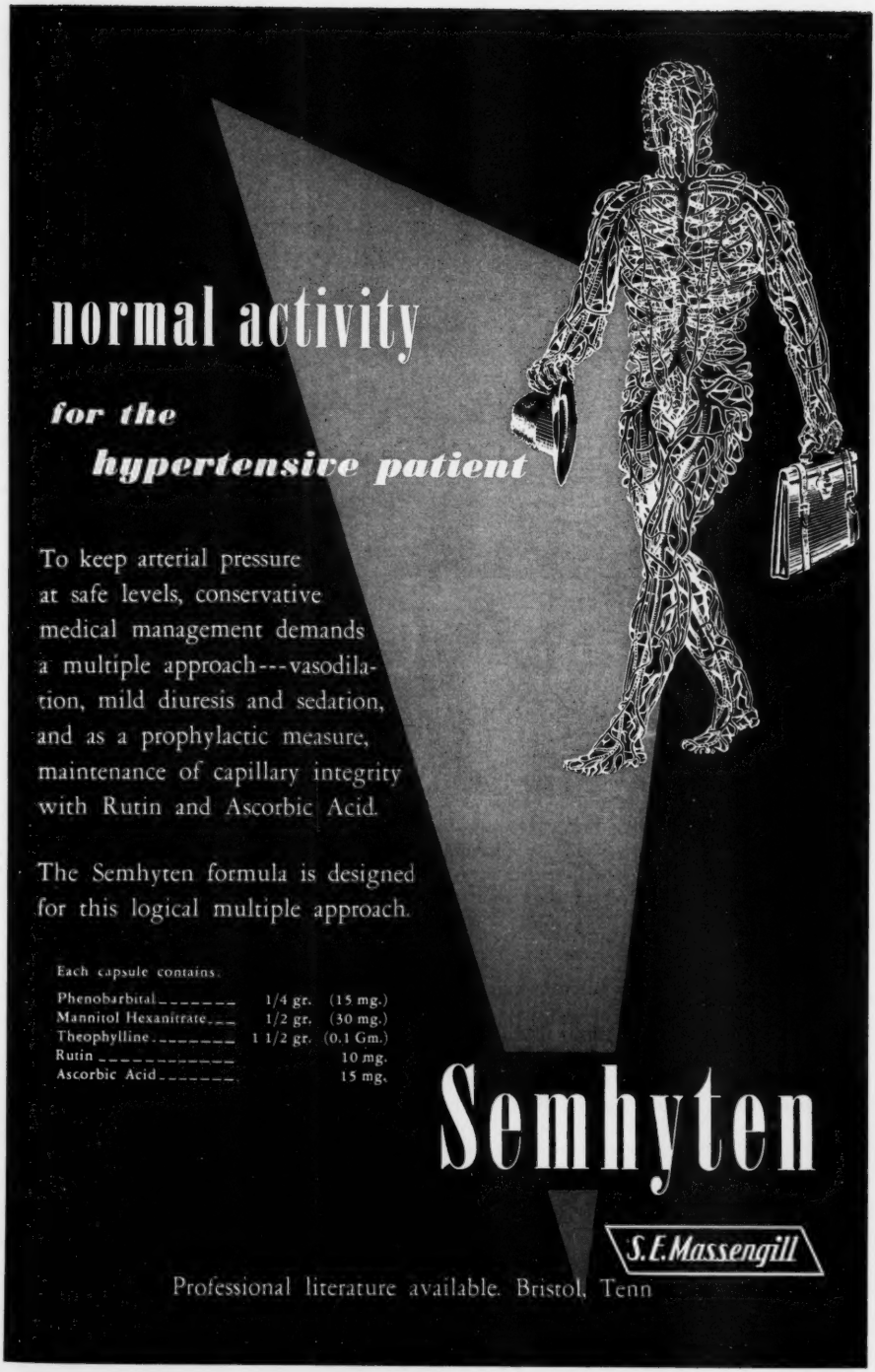
"Glukor is safe and effective regardless of pathology in male senility, whereas testosterone is frequently contraindicated and often harmful." [2]

"Therapy resulted in an unusually low death rate in 36 cases of angina and coronary heart disease." [2]

"Glukor relieved strain and stress, brought on *Euphoria*, and restored patients' mental and physical well being." [2]

[1]Gould, W. L., The Male Climacteric, Med. Times 79: 154-161 (March), 1951.

[2]Gould, W. G., Strosberg, I., Male Senility. Med. Times 79: 622-628 (October), 1951.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The Semhyten formula is designed for this logical multiple approach.
Each capsule contains:
Phenobarbital 1/4 gr. (15 mg.)
Mannitol Hexanitrate 1/2 gr. (30 mg.)
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You can reduce surgical risk by determining your patient's circulating blood volume with Warner's Evans Blue Dye before you operate.

You get an accurate determination which serves as a guide to preoperative addition of blood and protein, as well as to postoperative intravenous therapy. Adequate replacement is assured —sorely-needed blood is not wasted.

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"The danger lies not only in failure to maintain an adequate blood volume, but also in the excessive use of plasma, etc., and thereby running the risk of inducing heart failure or pulmonary edema."[1]

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1. *Gregersen, M. I., J. Lab. & Clin. Med. 29:1266, Dec., 1944.*
2. *Nelson, W. et al., Surg. 28:705-715, Oct., 1950.*

Warner's Evans Blue Dye

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*Hill, L. W.: New England J. Med. 242:288, 1950

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